Industrial Arts and Vocational Education

The SHOP TEACHERS' PROFESSIONAL MAGAZINE

June, 1953

Vol. 42, No. 6

Breaking through the Resistant Crust

Photo courtesy
Monsanto Chemical Company

In the man's hands is the equivalent in Krilium of pile of compost between man and boy. Krilium is not subject to bacterial attack, lasts much longer.

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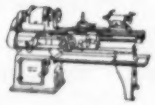

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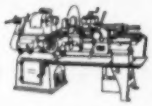
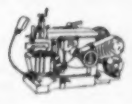


☐ ½" & 1" Collet TURRET LATHES



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JUNE
1953

VOL. 42 NO. 6

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

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This Month's Cover

The cover picture for the June, 1953, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows Joe Stone, of Tucson High School, Tucson, Ariz., as he forces grease into the joints of a new automobile with the help of a grease gun. Joe is a junior and is planning to continue in this field of auto mechanics.

The photograph was taken by Glendal Lander of Tucson High School, and sent in by Harry A. Goldstein, instructor of photography at the high school.

Your Next Year's Address

To make sure that you will receive your September issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, send us your new address, including the zone number, together with your former address. Please let us have this information no later than August 15.

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Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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ASSOCIATION NEWS

COMING CONVENTIONS

June 1. Wyoming Vocational Agriculture Teachers Association. Secretary, Hillman Snell, Greybull, Wyo.

June 10–12. Minnesota Vocational Agriculture Association, at Duluth Hotel, Duluth, Minn. Secretary, Henrik Aune, Morris, Minn.

June 11–12. Georgia Vocational Association, at Municipal Auditorium, Macon, Ga. Secretary, Miss Frances Roberts, High School, Chamblee, Ga.

June 14–17. International Graphic Arts Education Association, at Hotel Statler, New York City. Secretary, Otis H. Chidester, Senior High School, Tucson, Ariz.

June 16–19. Ohio Vocational Agriculture Association, at Ohio State University, Columbus, Ohio. Secretary, Howard Nowells, Logan, Ohio.

June 17–19. Pennsylvania Vocational Association, at Forest Inn, Eagles Mere. Secretary Ralph O. Gallington, Pennsylvania State College, State College, Pa.

June 21–23. National Association of State Directors of Teacher Education and Certification, at Miami Beach, Fla. Secretary, Eleanor Casebolt, 127 Capitol Bldg., Denver, Colo.

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SILVER ANNIVERSARY MEETING OF THE MICHIGAN INDUSTRIAL EDUCATION SOCIETY

The twenty-fifth annual M.I.E.S. convention was held at Grand Rapids, Mich., on April 16, 17, and 18, 1953.

As usual, the officers of this organization had planned an excellent program for their annual meeting, but this convention was given an extra special flavor because it marked the silver anniversary of the society's foundation.

The first general session held at 8:00 p.m., on Thursday, at which Harold J. Van Westrienen, chief of the Michigan T and I department was chairman, presented a dramatized contrast between the old manual training shop and the modern general school shop. It was too bad that more of Michigan's parents were not present to see how much more their children are now receiving from their school-shop training than they themselves had obtained.

At the Friday morning breakfast meeting Walter Scharmack, of East Grand Rapids, acted as chairman. Roy Featherstone, superintendent of schools at East Grand Rapids, the speaker, chose for his subject "The Right to Choose." He pointed out that here in America we still had the privilege to make many free decisions about our own lives, and teachers — especially shop instructors — have the opportunity of helping students to see the value of making choices which will aid them to become successful citizens.

At the business session held at 9:45 a.m., at which Dr. J. W. Giachino presided, after hearing the reports of the various officers of the association, called upon Andrew C. Luff, research chairman at Western Michigan College, to report on his study of the question of liability insurance.

Mr. Luff had some preliminary figures on what it would cost the individual teacher to get group insurance coverage of $10,000 per man. He also reported that three states now allow their boards of education to assume such liability.

Then Gilbert Seeley, director of industrial education of Jackson, Mich., introduced the speaker, Dr. J. L. Pylman, assistant to the superintendent of schools, Grand Rapids. His topic, "The Teaching Profession: Whither or Wither," urged teachers to ponder on where they in their field of education are going.

Costs of education are rising; teachers, especially those skilled in shop skills, are tempted by salaries now offered outside of the school; more is demanded of the teacher by the ever increasing class loads; increases in school population require increased staffs; and yet taxpayers complain that school costs are way out of step.

We must strive to improve our public relations, show what our work actually means to our youth, and to our times. If we do not do this our work regardless how far we have already advanced, will *wither* and die.

At the afternoon industrial-arts meeting on Friday, Dr. John L. Feirer, head of the industrial-arts department at Western Michigan College, Kalamazoo, acted as chairman.

The guest speaker, Dr. Ray Karnes, chairman of the industrial arts department at the University of Illinois, spoke on "Contemporary Design and Industrial Arts Objectives," and illustrated his talk with colored slides.

A panel discussion of the topic then followed.

(Continued on page 6A)

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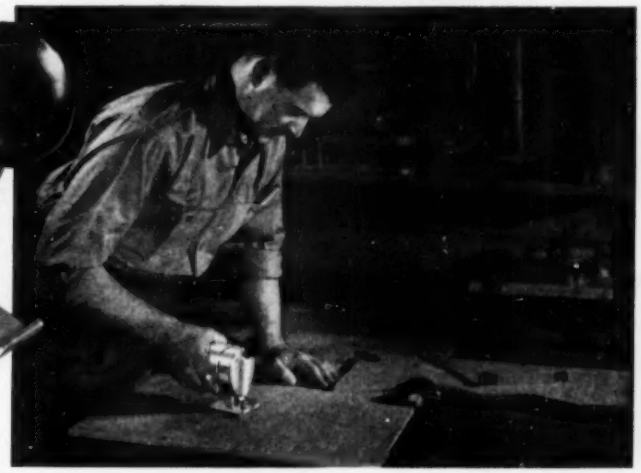

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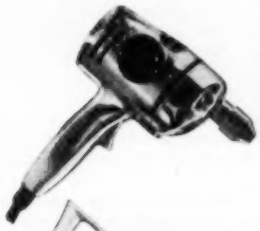

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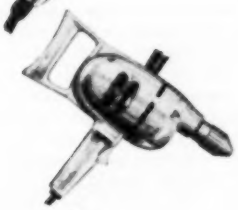

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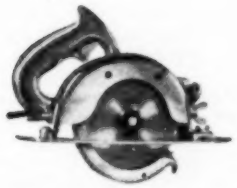

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ASSOCIATION NEWS

(Continued from page 4A)

The panel members were: Henry Beukema, George A. Willoughby, Dr. James Bowman, Bert Lamson, and Lindsay Farnan.

The silver anniversary banquet was held at 6:30 p.m. Friday, with Dr. J. W. Giachino, president, acting as chairman.

After the customary welcome and greeting speeches had been made, past presidents were introduced. An honorary life membership was given to Dr. Lee M. Thurston, and the master teacher award was granted to Warren Small, Detroit, Mich.

The main address on this occasion was given by Dr. Neil Bowman, National Association of Manufacturers, New York City, who gave a very meaningful presentation of what our country needs to put it back on a sound basis of economy and progress.

On Saturday morning the Epsilon Pi Tau, honorary industrial-arts fraternity, held a breakfast at which Dr. William E. Warner, Ohio State University, Columbus, Ohio, and organizer of E.P.T. spoke on the "Growing Responsibilities of Industrial Arts in Public Schools."

In his address Dr. Warner dwelt heavily on the necessity of fashioning the industrial-arts curriculum so it would vividly portray present-day technology to the students.

Saturday morning was given over to excellent round-table discussions on graphic arts, drafting, general shop, research, machine shop, and auto mechanics.

The Ship's program was held in connection with the convention luncheon on Saturday afternoon. The chairman on this occasion was Walter Scharmack, vice-president of M.I.E.S.

The report of the election results was given by Dr. Jos. Giachino, the retiring president. He announced that Walter Scharmack will be the president of M.I.E.S. for the coming year, and that Morley Dixon was elected vice-president.

The speaker at this luncheon was Juel M. Ranum, director of personnel of the Whirlpool Corporation at St. Joseph, Mich.

The Ship's program then followed at which Clyde C. Clack represented the forty or more exhibitors who had displayed their wares at this convention.

The Michigan teachers of industrial arts, vocational education, and teacher-education institutions cannot be complimented too highly on the fine school exhibits which they had on display.

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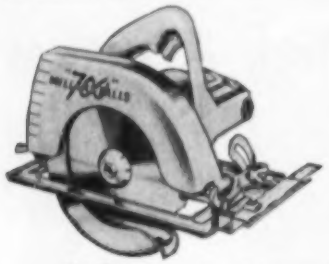

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AMERICAN INDUSTRIAL ARTS CONVENTION

The 15th annual convention of the American Industrial Arts Association was held on April 30, May 1 and 2, 1953, at the Stattler Hotel, Detroit, Mich.

The local arrangements committee, the chairman of which was Merrill C. Hamburg, supervisor of industrial arts, Detroit, Mich., is to be highly complimented for the excellency of the work which they performed.

The school exhibits could hardly have been excelled, and the 45 to 50 commercial exhibitors were well taken care of by the fine arrangements made for them by J. Ely Van Hart, supervisor of industrial arts, Elizabeth, N. J., who has been in charge of this phase of the convention arrangements for quite a number of years.

At the first general meeting held Thursday morning, April 30, the general theme — "Factors Influencing the Further Development of Industrial Arts Education: Developing an Action Program" — was presented by Gordon O. Wilber, head, department of industrial arts, State Teachers College, Oswego, N. Y., and John R. Ludington, specialist for industrial arts, U. S. Office of Education, Washington, D. C.

Four discussion groups were then formed to discuss the industrial-arts program, teaching and learning, evaluation, and public and professional relationships.

At the 7:30 p.m. session on Thursday the composition of a suitable undergraduate program for prospective industrial-arts teachers was considered in four separate groups.

Milo T. Oakland, head, industrial-arts department, Northern Illinois State Teachers College, DeKalb, Ill., was chairman of group 1; and E. E. Ericson, Santa Barbara College, Santa Barbara, Calif., was the main speaker.

The second group, under the chairmanship of W. C. Bicknell, department of industrial education, Southern Illinois University, Carbondale, Ill., discussed modern supervision in industrial arts.

J. Lyman Goldsmith, assistant supervisor of industrial arts, Los Angeles, Calif., was the speaker.

William E. Huss, head of the department of industrial-arts laboratories at State Teachers College, Oswego, N. Y., was chairman of group 3, which discussed industrial-arts experiences which promote behavior changes. The main speaker for this group was J. Osborne Johnson, director of industrial arts and special services, Denver, Colo.

At the Friday morning session the general shop received special attention.

(Continued on page 8A)

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Sands any width boards, angles, curves, metals, plastics for complete sanding instruction. 10" disc, 4" belt, table tilts 45°.

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ASSOCIATION NEWS

(Continued from page 6A)

J. Lyman Goldsmith, Los Angeles, Calif., was chairman.

W. E. Huss of Oswego, N. Y., spoke on "What Is a Good General Shop?" He emphasized that environment, opportunities for activities, boy interests, and contacts with interesting materials, tools, and acquaintanceship with job planning must be provided to catch and hold the imagination of the student.

Ira Madden, shop teacher of Detroit, not only said that the shop teacher must be enthusiastic in his work, but he demonstrated what an enthusiastic leader he himself was.

M. J. Ruley, supervisor of industrial arts, Tulsa, Okla., emphasized that our present-day teachers must be better prepared than formerly because class loads have increased while the number of available teachers has decreased.

Joseph Schad, of the Virginia Polytechnic Institute, said that the shops in their institution are of the comprehensive general shop type. Students at the teacher training level must be taught in shops and subjects similar to those that they themselves must teach.

The Friday afternoon session was conducted by Roy Radtke, director of industrial arts, Milwaukee, Wis.

Harvey K. Meyer, professor of industrial and vocational education, University of Florida, Gainsville, Fla., spoke on the various cultures from which stems our American culture.

Robert L. Thompson, associate professor of education, New York University, New York City, N. Y., showed how youngsters can be interested by making apparatus for performing the tricks used by magicians.

Kermit A. Seefeld, associate professor of industrial arts, University of California, Santa Barbara, Calif., outlined what is required to make a really successful teacher. What attracts students to a good teacher most are the teacher's personal morality, knowledge of his subject, and the fairness with which he treats his students.

The convention banquet on Friday evening was a very delightful occasion.

Merrill C. Hamburg was the toastmaster.

The main address was given by Arthur Dondineau, superintendent of public schools, Detroit, Mich. He emphasized the good that industrial arts was doing and expressed the hope that every child would finish high school, and that all would have the basic knowledge required to make a living.

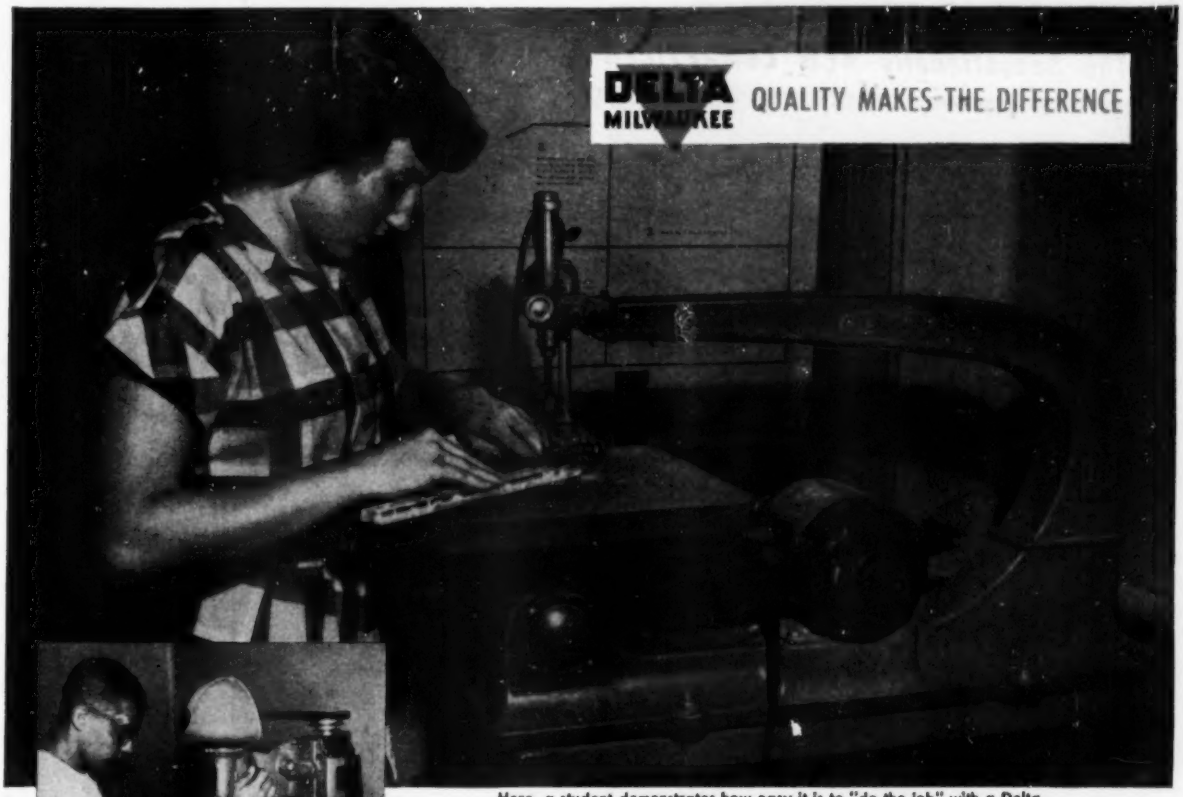
The Ship's program followed the evening session, with William F. Brown, representing the Atlas Press Company of Kalamazoo, Mich., acting as deck officer for the Ship. The entertainment was hugely enjoyed by all present, as were also the many fine gifts donated by the commercial exhibitors.

The business session on Saturday morning was well attended. Gordon O. Wilber presided.

Officers elected for the year 1953–54 are: president, Fred J. Schmidt, Jr., head, department of industrial arts, Ball State Teachers College, Muncie, Ind.; vice-president, J. Ely Van Hart, supervisor of industrial arts, Elizabeth, N. J.

After the business meeting, L. A. Patronsky, associate professor of wood technology at the University of Michigan, gave an excellent detailed account of how veneers are made, and what glues are best for making veneers for various purposes.

(Continued on page 16A)



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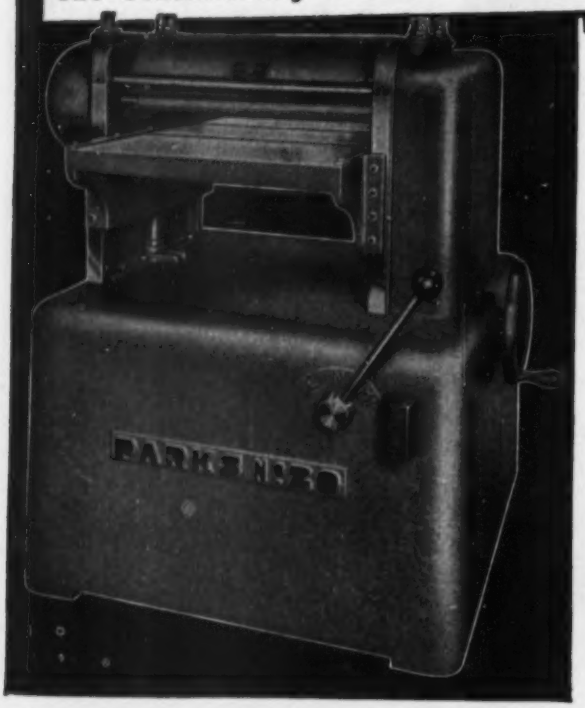

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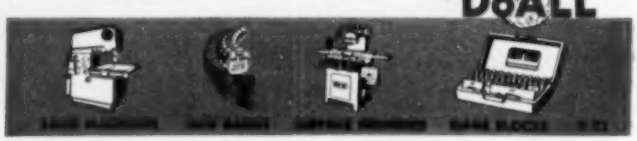

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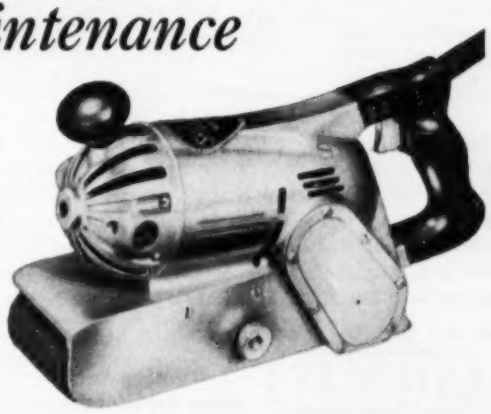

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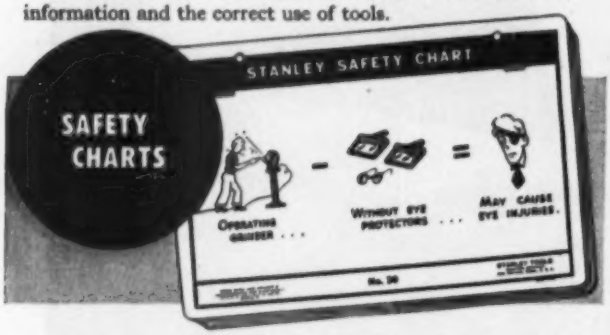

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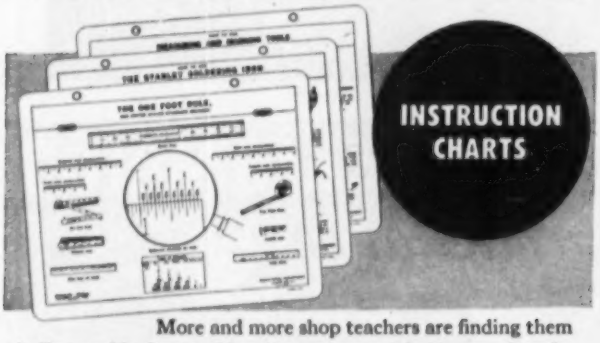

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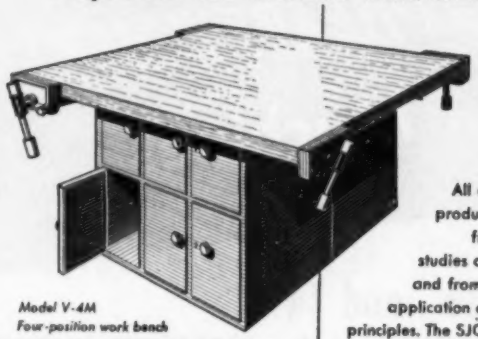

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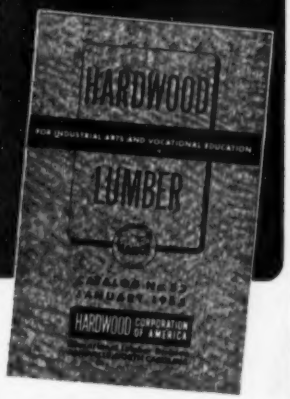

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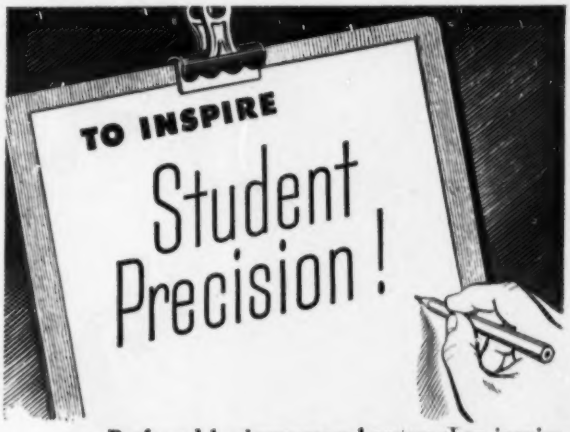

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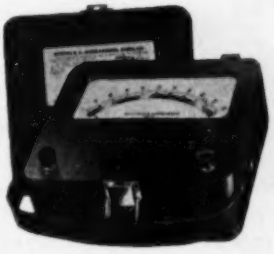

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INDUSTRIAL ARTS and
VOCATIONAL EDUCATION

JUNE 1953

Industrial Arts in the Public Schools of the City of New York

JOHN M. HURLEY
Acting Director of Industrial Arts
Elementary and Junior High Schools

and

LUDWIG MADSEN
Bureau of Vocational Activities
Board of Education
New York, N. Y.

The story of industrial arts in the city of New York is related in the same spirit as expressed in the Ordinance of 1787: "Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged."

In 1637 the first school was established by the Dutch in New Amsterdam. Adam Roelantsen was appointed schoolmaster. In 1642 he built a house in which he taught school. A tablet on the Produce Exchange on Stone Street marks the site.

The Start of Public Education in the City of New York

It was not until a considerable time after the close of the Revolutionary War that much interest was manifested in public education. In 1800 New York City had a population of about 60,000, with no school facilities other than those provided by private and church schools. In 1805, a body of public spirited citizens formed an association and applied to the legislature for a charter to establish a school society. The legislature approved the request and there was instituted in 1808 the Free School Society of the city of New York. The first building was erected on Tryon Road and was dedicated in 1809, DeWitt Clinton, first president of this society, made the dedicatory address.

In 1825 the New York Free School Society became the sole recipient of grants from public funds "for the education of such poor children as do not belong to, or are not provided for by any religious society." It thereupon changed its name to "The Public School Society of New York" and was permitted to levy a local tax. In 1842 it ceased to receive public funds, and a city board of education was founded to which the society turned over its buildings and property when it disbanded in 1883.

The development since then has been rapid and continuous and the present public school system is the result. In the October 31, 1952, registration report there were 910,934 students enrolled in the public schools, and 37,053 teachers. There are 561 elementary schools, 88 elementary and junior high schools combined, 54 junior high schools, 54 academic high schools, and 31 vocational high schools.

In 1847 the city of New York established its first tax-supported college and has since added three more. City, Hunter, Brooklyn, and Queens College comprise the largest body of collegiate students in the United States. City College has complete shop facilities for the training of industrial-arts teachers.

Junior High Schools

The general function of the junior high school program of studies is to provide students with a general education that will make them worth-while members of our present-day society. This outcome is attained through the following objectives: development of good health habits; development of sound thinking and reasoning; development of the skills of reading, writing, and speaking; development of an appreciation of beauty as well as creative expression; development of desirable social attitudes and relationships; development of an awareness and appreciation of economic relationships; development of desirable interests, aptitudes, and abilities through exploration.

The everyday activities of the average person have to do with various phases of mechanical and industrial interests. Therefore it is necessary that the student have exploratory-industrial learning experiences in the cultural subjects that are basic to a general education.

The objectives of the industrial-arts course of study in our elementary and junior high schools are:

To give an opportunity to explore, develop, and evaluate special interests which may serve to influence a student's choice of further education.

To secure a basic knowledge of materials, tools, and processes of modern industry.

To acquaint students with occupational information.

To provide opportunities for interrelating academic knowledge with shop activities.

To develop intelligent consumer attitudes.

To develop democratic living through shop activities and environment.

To develop an awareness of common hazards and habits of safety in school, home, and community.

To provide opportunity for the development of creative expression, initiative, and co-operative attitudes.

To develop an appreciation of good workmanship and design.

To develop a sympathetic understanding of, and respect for, manual labor.

To give the early adolescent an opportunity to "learn by doing" by constructing useful projects.

To develop hobby interests and useful leisure time activities.

To develop the ability to make simple repairs and improvements in the home.

In order to meet these guidance and exploratory objectives, a study of the occupational census of New York State was made. The largest areas of industry in terms of numbers of people employed are as follows:

1. Wood
2. Metal
3. Printing (Graphic Arts)
4. Electrical
5. Ceramics
6. Leather
7. Chemical
8. Food
9. Textiles

It is evident from the above tabulation that a worth-while industrial-arts program should take account of the processes and materials of these areas.

On the basis of the foregoing, six types of industrial-arts shops have been developed in the city of New York — wood, metal, electricity, graphic arts, ceramics, and general crafts. In the home-economics area five types of shops have developed, namely, food, clothing, novelty, millinery, and art weaving or textiles. The chemical industry is covered by courses in general science with such extensions as the related information of the shops provides.

Academic High Schools

The industrial-arts program in the academic high schools is a logical extension of the junior high school program. It aims at similar objectives with more mature students, many of whom are still uncertain as to a choice of vocation or higher education.

The needs of these students as well as those who have decided on commercial, technical, and professional pursuits are best met by providing a variety of work with opportunity for broad experience in the use of hand and machine tools.

General Criteria for the Selection of Shop Equipment

The obvious basis for the selection of shop equipment is the educational aims to be achieved through its use. Every tool, machine, bench, and piece of apparatus should provide for a maximum of pupil participation and learning through its use. Each item of equipment should represent a basic industrial process or a part of one. Learning through experience for purposes of orientation in an industrial society requires a variety of equipment rather than a duplication of specialized items. Generally the machines in use in schools are selected for their ability to provide experience in basic machine processes. No attempt is made to place in school shops the highly specialized machines found in industry. This is due principally to the difficulty and expense encountered in keeping them up to date.

All equipment should be designed and built, and in turn selected and used with specific reference to safety, size, height, strength, mental development, and experience of the individuals who use it. Thus the capacity, weight, power, speed, feed, and size of machines should be determined as far as possible by the maturity of the students who will use them.

Obsolescence is an increasingly important factor which school officials must recognize and meet in developing modern shop programs. American industry *retools* periodically for a world where change is the only certainty. Schools are faced with the same problem. Equipment manufacturers are now producing moderately priced equipment of improved design which makes periodic replacement possible and economical.

Specific Criteria for the Selection of Shop Equipment

a) To provide the student with basic knowledge of materials, tools, and processes of modern industry.

b) To give the student an opportunity to "learn by doing," by constructing things.

c) To meet the maturity of the students who are to use the shop, as well as the type of work to be done.

d) To be suitable for the construction of projects as listed in the course of study.

Procedures Followed in the Selection of Shop Equipment

Specific recommendations for equipment for each of the industrial-arts shops in junior high schools are listed on the typical shop layouts prepared by the Bureau of Vocational Activities and submitted to the Division of Housing and Business Administration for its approval. The selection of this equipment is based on the criteria listed in the foregoing.

The Bureau of Vocational Activities, after receiving requests from school principals and superintendents for school shop changes and additions, sends a representative to visit the school. After conferences with shop teachers and principal to determine school needs, this bureau, drawing on its past experience, prepares a layout and recommends the equipment and structural changes necessary. In preparing these layouts and lists of recommended equipment, full cognizance is taken of the aims, objectives, standards, and criteria as they apply to each division and type of shop. The layouts and recommendations are then submitted to the divisional superintendent and the superintendent of the Division of Housing and Administration for approval. They are then forwarded to the Bureau of Plant Operation and Maintenance for the preparation of detailed plans and necessary specifications.

In the case of new construction, the Bureau of Vocational Activities prepares layouts and equipment recommendations at the request of the Superintendent of the Division of Housing and Business Administration. These layouts and equipment recommendations, after receiving the necessary approvals, are forwarded to the Bureau of Construction for the preparation of detailed plans and necessary specifications.

General Recommendations

In order to insure equal opportunities for the students in all of our schools, the following program has been initiated:

1. Improve present shop facilities.
   a) Replace worn out and obsolete equipment.
   b) Replace equipment no longer

suitable to meet needs of course of study.

c) Provide additional equipment to meet the needs of the curriculum.

d) Improve structural facilities, i.e., lighting, washing, and storage facilities.

e) Increase size of shops.

2. Provide additional shops:

a) In schools that lack shops.

b) In schools that have an insufficient number of shops to meet the needs of the students.

Vocational Education in Peru 1944-1952

DR. STUART ANDERSON
Technical Director of Vocational Education
and
J. ARTHUR ELMER
Specialist in Vocational Education
The Institute of Inter-American Affairs
Division of Education
Lima, Peru

(Continued from page 157 of the May, 1953, issue)

In 1950, the Government of Peru launched a ten-year plan for the improvement of public education. A part of this program included the orientation of the educational system toward a more practical program with emphasis on vocational education. The construction of what are called "Grandes Unidades Escolares," in the larger cities of Peru was the initial step in this program. This plan for the improvement of education called for the construction and organization of 30 technical schools operating at the secondary level. The basic problem here was, and still is, to construct and equip modern technical education buildings and to prepare teachers for the technical schools of the entire Republic.

Because of this new building program, the need for more shop teachers was evident. In co-operation with the Ministry of Education, SECPANE organized a teacher training course designed to provide teachers for at least two of the Unidades which were to be completed by 1951. The additional need to provide for teachers who leave the service, as well as the probability that more "Unidades" would be built in the future, further justified the need for this program. This short course of eight months was considered of an emergency nature. Although it was not intended to be a substitute for plans which were under way to establish a much needed teacher preparation program, it became the initial step in the present long range plan.

The establishment of trade and industrial schools has an obvious relationship to the improvement of Peruvian industry. However, the work of the Servicio and the Ministry in building these new schools in urban centers will have been in vain unless ways and means are found of providing competent teachers.

On October 18, 1950, the Ministry of Public Education of Peru and The Institute of Inter-American Affairs (IIAA) signed a five-year basic agreement for the extension of activities which had been carried on under the joint program since its beginning. Authorization by these governments for the signing of the five-year agreement, instead of an annual agreement, make possible the long range planning of the Cooperative Education Program. One of the most important sections of this basic agreement authorized the construction of a new Central Normal School. It was decided to locate this new campus near Chosica, a city of 15,000 people, 25 miles east of Lima in the fertile Rimac River Valley. Here, on a campus of 47.6 hectares, (about 118 acres), construction has already begun on an administration building which will include a cafeteria, student union, and auditorium in addition to the general administrative offices. Two one-story shop buildings, one men's dormitory, and an education building, are also under construction. In the near future another dormitory, a library, and a gymnasium will be added. Future plans include buildings for the humanities, science, social science, home economics, and additional dormitories for men and women.

Selection of the Staff

The organization of the technical division of the Central Normal School required considerable planning. Long and careful study, as well as lengthy discussions went into the construction of the curriculum for the preparation of teacher of vocational shop subjects.

Once agreement had been reached with the Ministry of Education concerning the problems of curriculum, then followed the need for finding persons qualified to teach those subjects included in the curriculum. Most of the month of December, 1950, was spent in the preparation of trade tests that were to be used in the selection of prospective shop teachers for the Central Normal School. One hundred and twenty-five men appeared for interviews in answer to several newspaper advertisements for qualified shop teachers. Forty-eight of these were judged as sufficiently well prepared to take the trade tests. The written trade tests eliminated more candidates leaving only 22 who were qualified for practical tests. Eight men, each judged to be the best in his trade specialty, were finally selected. These eight men were given experience as teachers of the shop courses during the five-week summer session for in-service shop teachers.

Much work of planning and organizing preceded the formal opening of classes, on April 9, 1951, of the technical division of the Central Normal School. By special arrangement with the Peruvian Ministry of Education early in the year the new vocational building of the high school "Melitón Carvajal" was designated as the temporary location of the division.

During the year or more when the two shop buildings on the Central Normal School campus near Chosica are under construction, the industrial education division of the college will be housed in the Unidad Escolar "Melitón Carvajal." The shops and classrooms here are adequate

for the activities for the program of teacher education. A large part of the same school also is occupied by the Ministry of Education.

Since classwork is taken only in the afternoons, the morning hours of the eight normal school shop instructors are spent in the preparation of written instructional materials and practical shop instructional aids. All the instructors are responsible to the North American specialists directing the division's operations. Supervision and counseling is administered in a continuous pattern resulting from the maintenance of close office, classroom, and shop contact between the Servicio's specialists and the normal school instructors.

Course outlines were developed from trade analyses made by the shop instructors. These outlines were filled in gradually as the school year advanced and the instructors had time to do research, to select, and to edit instructional materials. By the end of the school year each instructor had developed a fairly complete first year or beginner's course in his trade specialty.

Selection of the Students

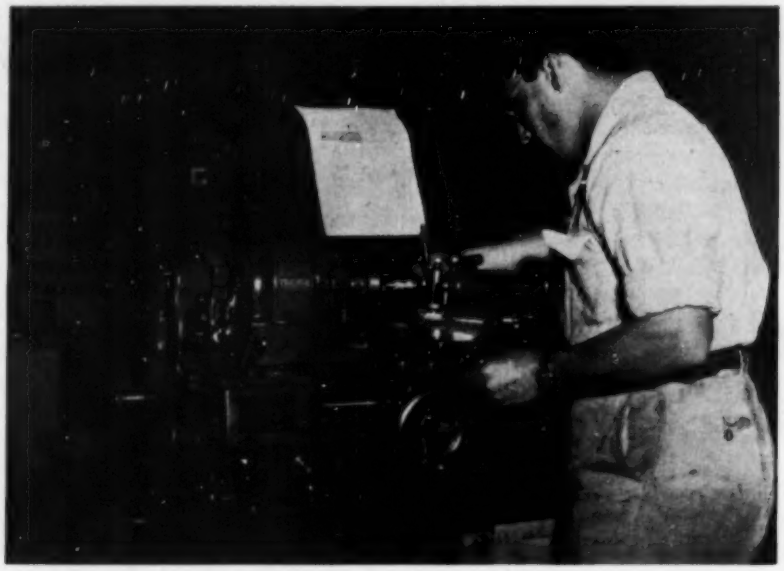
Objective tests were developed for the selection of the normal school students for the technical division during February and March of 1950 and the administration of these tests resulted in the final selection of 48 students who were placed in the following trade specialties:

Woodworking	8
Machine shop	10
Electricity and radio	8
Auto mechanics	8
Foundry and patternmaking	6
Forging and welding	8

Most of the students selected for the industrial-education division were recent graduates of technical institutes. Others were teachers in service in fields other than industrial education. The students selected receive scholarships which include board and room while in school, plus all instruction and instructional materials. Before formal admission to the normal school, the student teacher is required to sign a contract with the Ministry of Education wherein he agrees to:

1. Accept and take immediate charge of a teaching post that the Ministry assigns him.

2. Remain on active duty at his assigned post for a period of not less than three years.



Student working on a bench lathe in the Technical Division of the Central Normal School, Lima, Peru

During the half day of shop practice the 48 normal school men helped, in their trade specialty, the shop instructors in the work of installing the machines and preparing storage and checking facilities for the hand tools and materials that arrived on the site of the new school. In this way these men, being prepared as future shop instructors, acquired valuable experience in the problems of shop installations, organization, and management. This experience will probably help them in their future careers as teachers when they are confronted with a similar situation.

The completion of the major installations in the shops was effected by the end of the fiscal year. In July, 1951, 75 boys from the vocational education section of the secondary school "Melitón Carvajal" were admitted to the shops. These boys formed the demonstration classes where the normal school men do their practice teaching.

In April, 1952, 44 men students started their second year of industrial teacher training at this school. Teachers are being prepared in auto mechanics, electricity and radio, carpentry, machine shop, forging and welding, and foundry and patternmaking. This group completed a two-year course in January, 1953.

Two Shop Buildings

The industrial-education division of the Central Normal School will be housed in two one-story buildings which are approximately 60 by 255 ft. each. These two structures, which are made of reinforced concrete and brick, will house ten shops. Auto mechanics, machine shop and bench metal, drafting, graphic arts, and art metal, leathercraft and wood carving, plus an exhibition room will be included in the South building. Electricity and radio; plumbing and sheet metal; foundry and patternmaking; welding and forging; and carpentry will be located in the North building. In addition to the regular work area, each shop has an office, storeroom, and washroom. Small classrooms adjoin six of the shops.

Technical Advice and Assistance

One of the first plans of the co-operative assistance program to be implemented concerned advising the Ministry of Education on problems of selection, purchase, and installation of shop machinery and equipment. Working co-operatively with Comandante Fernando Romero, Peruvian director of Technical Education in 1945, curriculum planning, surveys, and course organization were also given early consideration.

The staff of the vocational education division has been continually available and has rendered services to other divisions of the Servicio when called upon for technical advice or assistance. The same relationship has existed with the division of technical education of the Ministry of Education of Peru.

When the Servicio began working in

Students in the machine shop of the Technical Division of the Central Normal School, Lima, Peru

Peru, school buildings were rented and equipment was almost non-existent in other than the Polytechnic Schools. During the period 1947–48, when Comandante Fernando Romero was director of technical education, funds were finally obtained to buy equipment for industrial schools. The Servicio aided in the purchase, distribution, and installation of this equipment, although teacher training activities suffered somewhat through lack of personnel during this change of emphasis.

In 1948, by agreement with the then SCPNE, the Peruvian Ministry of Education, Technical Division, provided $565,000 for the purchase of basic tools and equipment for the 40 industrial schools. The Vocational Division technicians were in charge of the purchase, distribution, and placement of this equipment. Visitations were made to the schools which were to receive equipment. Plans for its installation were drawn up in each case. At this time, only small funds were available for the construction of new school buildings and the expansion of improvement of existing structures. Most of the available funds were concentrated in equipment purchase. One basic reason for this was the fact that most Peruvian schools were on rented properties and any improvements that were effected would eventually revert to the private owner. During this period of planning for shop installations, shop layout plans were drawn for over 75 per cent of Peruvian industrial schools. With the advent of the present government in 1949, considerable money was obtained for the construction of the so-called "Grandes Unidades Escolares," which are government owned educational units comprising elementary and secondary levels and including an industrial school curriculum. Existing industrial schools in many cases will be transferred to these units. The Vocational Division of SECPANE including the IIAA specialists, Earl N. Gessler and J. Arthur Elmer, with the Peruvian representative, Engineer Gustavo Reusens, were called upon in 1950 by the Ministry of Education, Technical Division, to aid in the design of the buildings to house the Vocational Department of these units, as well as the planning of the distribution of equipment in the various shops themselves.

At the request of the Ministry of Education in 1950, the Servicio undertook the designing of the shop areas for all the shops of five "Grandes Unidades Escolares." The plans made available included the layout of each shop's equipment and its electrical connections; the design of storage rooms for tools and materials; blueprints of standard work benches and tool bins; and panels and drawings for simple shop furniture.

The purchase of $65,000 of equipment for the shops of two new "Unidades" in Lima was entirely negotiated by the Servicio. The lists specifying the essential tools and machinery to equip the basic shops of each school were prepared and submitted to suppliers in August, 1950 for quotations, specifications, and delivery dates. Considerable difficulty was encountered in finding acceptable equipment and many substitutions had to be made. Shipments began arriving in March of 1951.

An inventory system proposed for the maintenance of records in the Peruvian Technical Division by the kardex system was prepared and presented to the director, Engineer Salmón de la Jara.

The Servicio studied and made recommendations that affected the curriculum structure of the industrial schools. By means of trade analyses, and instruction in course planning and construction, changes in the plan of studies could be defined and urged in order to keep the industrial schools in step with modern industrial developments. Mr. Elmer of the IIAA staff visited all of the cities which had auto-mechanics shops. In addition to visiting the industrial schools in Lima at frequent intervals, trips of inspection were made to Sullana, Cuzco, and Trujillo where opportunities were present for conferring with teachers and directors on problems of instruction and school management.

The present shift to the Gran Unida Escolar "Melitón Carvajal" represents a divergence from established practice in this respect. Since 1949, less money has become available for the betterment of existing vocational equipment or buildings. The program of construction of "Grandes Unidades Escolares" was begun and funds were concentrated upon new building construction intended principally for elementary and secondary general education ends.

With the "Grandes Unidades Escolares" incorporating the vocational school programs of their immediate area, new demands are being received from the Ministry for help in planning and purchasing. This type of service, together with a concentration upon the development of a permanent industrial normal school program of training, represented the emphasis of Servicio objectives in 1951. In 1951 and 1952 the education Servicio provided the procurement services for the purchase of new shop equipment for seven "Grandes Unidades Escolares." Funds to purchase these tools and machines, manufactured in the U.S.A., were contributed by the Ministry of Education and

SECPANE. Peru contributed approximately $166,666 and the United States government about $103,333 for the tools. Total SECPANE funds are established at a ratio of $2.62 from the Peruvian government to $1.00 from the U.S.A.

Prevocational Education in Elementary Schools

Many children leave school at the end of elementary school and go to work. The primary school does not offer orientation in vocations or shop activity. Only a small proportion of the pupils who complete the elementary school go on to high school. And only a fraction of the students in the secondary schools are given shop experiences. Consequently, it was believed that this apparent need could be met by offering elementary industrial arts in the fourth and fifth years of the primary school. In 1946 three schools were selected in which to set up model programs of this nature. Two schools for boys and one for girls were chosen. The girls' program was delayed until the boys' programs were established. The two schools selected were considered fairly typical of Peru. The smaller school is in a rural community near Lima, while the larger one is located in the densely populated Rimac District of Lima. Shops in carpentry, mechanics, and ceramics were organized. SECPANE cooperated with the Ministry by helping with the selection of teachers, writing specifications for equipment, developing plans for building changes, establishing and conducting a training program for the teachers selected, and initiating and supervising the entire program. A guiding committee comprising Comandante Romero, director of Technical Education; Dr. Zegarra Araujo, director of Common Education; and Dr. Manuel Velasco, director of Normal Education; all members of the Ministry worked with Earl N. Gessler in planning this program.

Home-Economics Program

Servicio activity in vocational education for girls in Peru began in 1945 with the establishment of a home-economics program that included parents' education and women's trades. In 1946 the program was expanded to include work in nutrition and health in the rural regions of Puno and Talara and in the Rimac Section of Lima with the co-operation of the health and sanitation bureau of the Peruvian Ministry of Health. In this same year a six-week short course was given in nutrition and home economics to teachers for the purpose of revising the curriculum for these same industrial schools for women. In 1948, courses in cosmetology began in the Women's Industrial Institute in Lima.

Teacher education courses and the development of instructional materials for vocational school courses for girls were regular functions performed in the years up to the middle of 1950. Shop design and layout and the procurement of equipment for vocational school classes were included among the most important activities of the Servicio in the field of vocational education for girls.

Students in the electric shop of the Technical Division of the Central Normal School, Lima, Peru

The services of a North American specialist in home economics and her Peruvian assistant were made available during 1951 in order to carry to completion those projects initiated in their field of activity in previous years.

During the fiscal year 1951 considerable equipment was distributed to the industrial schools for women. A total of 13 schools received equipment for their kitchens and dining rooms that included stoves, electric refrigerators, wall cabinets, metal tables with sinks, work and serving tables with shelves, and large kettles and pans as well as working utensils. Most of this equipment came from surplus U. S. stocks in the Canal Zone.

The Servicio specialist in home economics has rendered technical advice and information concerning problems related to the Central Normal School's dormitory arrangements, its kitchen and dining facilities, and its courses of study, special classrooms and laboratories for home-economic subjects.

Publications

One of the first needs noted by the vocational specialists was for technical books and instructional materials in the Spanish language. Although a few publications were available they were usually unsuitable for teaching purposes, too expensive for students to purchase, or obsolete. In most technical areas, no Spanish publications were available.

Because a number of excellent books on technical subjects had been printed in the English language, it was decided to make translations of this material rather than prepare original manuscripts in Spanish. Permission to reproduce well-established books was obtained from the various publishers in the United States. All translating and proofreading was done by specialists and Peruvian staff members in the vocational division.

Since 1946, when the first three books were translated, 36 technical books have been reproduced. Although 1000 or 2000 copies of each book were printed, usually by offset, 14 texts are no longer available because the demand for these books has exhausted the supply. More than 38,000 books have been either donated or sold out of a total of 45,000 copies prepared.

The books are sold at cost to educational institutions. The average cost is S/o. 10. for a 400-page book. Approximately 50

per cent of the paper for publications was furnished by the Peruvian Ministry of Education.

The vocational division of SECPANE also has translated and reproduced nearly twenty pamphlets. Copies of these instructional materials were sent to the various schools in sufficient numbers so that they could be used as textbooks for the operation of the different machines and equipment.

In addition to giving two copies to each of the 43 men's vocational schools and the 25 women's vocational schools, the naval, military, aeronautical, engineering, and navy arsenal schools of Peru each received the same number of books. The U. S. Air, Military, and Naval Missions were given copies as were all other IIAA educational programs in Latin America and the Washington Office of IIAA.

A number of other technical publications are now in various stages of preparation.

A summary of the publications reproduced in Spanish follows:

1946
- Heat Treatment of Iron and Steel
- Industrial-Arts Manual
- Course in Dressmaking

1947
- Shop Arithmetic
- Course in Line Trade
- Fundamentals of Mechanical Drawing
- Course in Electric Welding
- Fundamentals of Alternate Current for Radio
- Course in Carpentry
- Heat Treatment for Metals
- Bench Mechanics
- Elements of Shop Drawing

1948
- Course in Leatherwork
- Mathematics for Plumbers
- Course in Sheet Metal
- Course in Milling Machines

1949
- Shop Mathematics
- Course in Blueprint Reading
- An Introduction to the Art of Instruction
- Fuels and Carburetion
- The Internal Combustion Engine
- Automotive Brakes
- Electrical Systems of Motor Vehicles

1950
- Hand Power and Measuring Tools
- Visual Aids
- Armature Winding

1951
- Shop Organization and Management
- Strip Films, 35 mm.
- The Instructor and His Job
- Technical English
- Shop Mathematics
- Transmission and Drive Units
- Elements of Radio Electricity
- Radio Repairs
- Woodworking and Furniture Repair
- Plumbing Installation and Repair

1952
- Chassis, Body, and Trailer Units
- Elementary Forge Practice
- Fundamentals of Direct Current

1953

In progress:
- The Body Finisher, Woodworker, Upholsterer, Painter, and Glassworker
- Body Fender and Radiator Repairs
- Electrical Measurements
- Electric Motor Control
- Alternating Current
- The Junior Radio Repairman Trainee
- Radio Mechanics Instruction Book
- Suggested Course in Sheet Metal Machine Processes
- Applied Mathematics for Machine Shop
- Heat Treatment of Iron and Steel
- Units in Patternmaking and Foundry Work
- School Shop Safety Manual
- The Craftsman Prepares to Teach
- Methods of Teaching Industrial Subjects
- Occupational Analysis
- Methods of Teaching Applied to Industrial Subjects
- Problems of Industrial Education
- Psychology for Industrial Teachers

Student Rating Sheets for Self-Evaluation of Projects

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The teacher's evaluation or judgment alone is not always a true measure of the student's progress in project construction. Teacher evaluation of projects without giving the student a voice in the grading fails to satisfy the student. The student must accept the mark and strive to do better the next time even though he is not sure of his individual weaknesses. True, the student's idea of the grade he deserves for a certain project may be wrong but at least he should know why his standard of evaluation is not correct. In fairness to the student, some steps must be taken to develop the valuable habit of self-evaluation and create a better rapport between teacher and student.

The ability to evaluate or rate one's self and work is definitely one of the aims in any industrial-arts course. An analysis of the objectives of this field will reveal a definite concern over the development of this desirable trait. Quite often, in the

FIGURE 1. Self-Evaluation Sheet for Projects

Directions: Circle the score that you give to each question.

A. *Orderly Performance of Construction:*					
1. How complete was the construction information on the plan sheet?	6	7	8	9	10
2. Was the working drawing usable or did it need some changes?	6	7	8	9	10
3. To what extent did you follow recommended processes and procedures?	6	7	8	9	10
4. To what extent were you able to solve problems of construction?	6	7	8	9	10
B. *Quality of Workmanship:*					
1. How well does the completed project measure up to specifications? (size, shape, squareness, etc.)	6	7	8	9	10
2. How well did you select, use, and care for tools while building the project?	6	7	8	9	10
3. Were materials used carefully and with minimum of waste?	6	7	8	9	10
C. *Quality of the Completed Project:*					
1. How neat is the completed project? (smooth surface, no surplus glue, tight joints, even finish, etc.)	6	7	8	9	10
2. How does the finished project compare with one of similar design and construction?	6	7	8	9	10
3. Can the project be used for the purpose it was designed for or does it need changing?	6	7	8	9	10
Add all the circled scores to give grade for project			.....		

process of meeting the various objectives of the course, this important part is overlooked. It may be that the instructor has found no acceptable method with which this desired outcome may be realized.

By using a rating sheet the student is given an opportunity to evaluate his project in terms of certain criteria considered important in project construction. He will be able to see that finish alone is not the standard, or that workmanship by itself does not determine the grade. These points along with others listed will give him a clear picture of all the necessary points to be considered before a grade can be given to his project. Through the use of these rating sheets the instructor and student should be able to arrive at a grade satisfactory to both.

The two student self-evaluation sheets for projects presented in this article offer a possible approach that may be used. They are developed for use in a junior high school situation but could be revised for use in other grade levels. Point weight could be varied to suit the individual instructor.

Figure 1 represents one method of rating while figure 2 pictures another style of approach. Both list similar points to consider in obtaining a project grade.

The civilian population of the United States is consuming more gasoline than at any time in its history. Coinciding with the record number of motor vehicles on the nation's highways — approximately 53 million in 1952, over two per cent higher than the previous year — the automotive gasoline consumption in 1952 was more than 40 billion gallons, over seven per cent more than in 1951. It took almost 200,000 service stations to supply the American drivers, and these operators shared an income of nearly 10 billion dollars from the public. — *Petroleum Newsnotes.*

FIGURE 2. Self-Evaluation Sheet for Projects

Possible grades for each item

Planning:	4	5	6	7	*Grades given for each item*
Building information	Unable to work from the plan	Some steps wrong or missing	A few minor changes needed	Plan was complete — no changes needed	.....
Working drawing	Incorrectly drawn — poor dimensioning	Able to use with some changes	A few needed dimensions missing	Able to use and work from with no changes	.....
Design and usefulness of project	Not usable for purpose intended	Able to use with some changes	No changes made — could be redesigned	Well designed for purpose intended	.....
Problem solving ability	Solved no problems	Solved only the easy problems	Solved nearly all the problems	Solved all the problems	.....
Construction	9	10	11	12	
Appearance	Assembled poorly — not cleaned up	Not very neat — good assembly	A few final touches to be perfect	Clean, neat, and commercial in appearance	.....
Method of building	Used own methods — "cut and try"	Made poor use of the methods shown	Followed correct methods most of time	Used the demonstrated methods	.....
Use of tools	Careless with tools	Used tools correctly most of time	Correctly used at all times	Correctly used and cared for at all times	.....
Use of materials	Wasteful and careless with materials	Wasteful with materials at times	Always careful of materials	Conserves material at all times	.....
Accuracy of work	Fails to meet specification	Work is approximately correct	A few measurements are off	Meets all the specifications	.....
Use of working time	No effort made to use time wisely	Time used fairly well	Wasted a small amount of time	Used time to best advantage	.....
				Add individual item grades to secure project grade	.....

Vocational-Industrial Education and Industrial Arts—Time for Clarification

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Apparently there is a continuing confusion on the senior secondary level between the term *industrial arts* and the term *vocational-industrial education*. Although we have had many articles, conference talks and other expressions on the matter by leaders in both fields, there remains a doubt in the minds of many as to the true distinction, if any. Certain eminent speakers maintain that there is really little difference between industrial arts and vocational-industrial education and that the trend is for them to become more and more alike. Issue has been taken with this idea in the past, and is taken here again. There *are* important distinctions between the two types of shop activities and there are good reasons for identifying and maintaining the distinctions. It is very important that persons primarily working in these fields seek to clarify the matter in their own minds and expressions, and then provide leadership in eliminating the confusion which is widespread among other educators and lay persons. Until this is done, both types of activity will continue to suffer losses.

What Causes This Confusion

There are several conditions which contribute to this confusion. First of all, both types of activity often use the same or similar tools, equipment, and materials and there is some overlap in the operations, understandings, and other outcomes. Secondly, especially in smaller schools, the two types of instruction are at times attempted in the same shop and under the same teacher: some pupils being served in terms of needs which are *vocationally unspecialized* and others being prepared for entry into *specifically identified vocations or vocational fields*. Third, we often fail to differentiate between *specialized* vocational education; preparation pointed to specifically identified vocations or vocational fields on one hand, and *nonspecialized* or *general* vocational education on the other hand. Industrial arts, as a phase of general education, properly contributes to this latter type of vocational education, as should *all* of the areas of general education serving the "common needs of the majority" — in this case in terms of the *common* demands of most vocations. A fourth source of confusion stems from our program of federal promotion of specialized vocational education; currently through the financial and policy provisions of the Smith-Hughes and George-Barden Acts. Biased or offhanded consideration of these provisions easily leads to the *mistaken* idea that *only* that which qualifies for subsidy under these Acts is specialized vocational education. Or conversely, the false inference that when an activity does not qualify for subsidy, through failure to conform to time requirements or some other provision of the Acts, it is *per se* not specialized vocational education, but industrial arts: i.e., general education shopwork. Such thinking overlooks the true distinctions and provides a major source of confusion. Some have observed that this is no accident; that the subsidized program is a "sacred cow" for many who, in their attitudes of worship, fear loss of stature for their "cow" and themselves through the use of rational terminology. This strict allegiance to the tenets of vocational education, forged into our federal laws, without doubt was justified in the earlier days of the work. Today there is much evidence that the values of specialized vocational education are generally accepted and often lauded by educators and the lay public. The growing practice in larger cities of offering specialized vocational education without special financial aid bears out this point. In city after city we find large numbers of pupils enrolled in unsubsidized but nevertheless specialized vocational-industrial curriculums. Frequently there are more of these pupils than there are in the programs which meet the requirements of the federal acts. Generally, the unsubsidized curriculums are not called *vocational industrial*. More often they bear such labels as *industrial, technical, terminal,* or, worst of all, *industrial arts*. Consistently they provide lesser amounts of shop experience than called for by the federal acts, and only incidental related instruction.

Other Confusing Conditions

Among the remaining conditions contributing to this lamentable confusion, one other ought to be mentioned here, especially because we who work in these fields have it in our power to remedy the situation. There is a general tendency to use terms loosely in our professional writing and in both our formal and informal discussions. We are obligated to persons outside of our field, as well as for clarity in our own communication, to be as careful and specific in our use of terminology as our meanings demand. There are many circumstances under which the distinctions between similar sounding terms are most important. We are here concerned primarily with *vocational-industrial education* and *industrial arts*. Other examples of paired terms would include *specialized* and *general* education; *vocational* education and *vocational industrial education,* or some other subdivision: *subsidized* and *unsubsidized* activities; *vocational* and *extra-vocational* or *nonvocational*.

Distinction Between Vocational-Industrial Education and Industrial Arts

What then is the important distinction between specialized vocational-industrial education and industrial arts? Simply one of purpose. Probably the most uncontroversial statement in this field today is that industrial arts is general education. Unfortunately, this is not too helpful, and

often represents the point of departure in our common understandings and agreement. General education is here accepted to include activities designed *primarily* to serve the *common* needs of the *majority* of pupils. Conversely, those activities designed primarily to serve the specialized needs of a few as contrasted with the needs of the majority would *not* be general education, but rather, specialized education. To further define industrial arts we need merely to identify those common needs of a majority of persons which can be served best through school shop and shop related activities. It is helpful, especially to teachers and supervisors, to identify the *unique* contributions of industrial arts, for it is on these that it is properly justified. Industrial arts joins with all other aspects of general education in serving many very important common needs of all pupils, such as *exploration* of aptitudes, *development* of abiding interests, fostering of *generalized habits, attitudes, and appreciations.* But industrial arts, no more than any other area of the school program can be justified on these objectives alone. For that reason they do not rightly serve to identify the unique function and nature of industrial-arts activities. There are several important areas of life activity which include common needs that can be served *best* by school shop activities. In 1929 Magill[1] suggested that these include *home mechanics, leisure time shop abilities, consumer knowledge, and owner-driver auto mechanics.* These are areas which can be served in the school shop without resort to formal discipline and dependence on high degrees of transfer. They can and should form the backbone of our industrial-arts program, providing the criteria for selecting learning activities designed to develop the needed characteristics. For many workers in the field they call for a sharp departure from *manual training* with its trappings of formal discipline; dependence on high degrees of transfer and abstract exercises. They also provide more direct and concrete objectives, allowing us to avoid the long lists of high sounding but also more questionable and less unique outcomes which are often claimed for industrial arts.

Vocational Education Not Always Subsidized

For the purposes of comparison, a statement might be made here of the relative nature of specialized[2] vocational-industrial education, subsidized or not. While evidently and properly making an important contribution to the general education of pupils enrolled therein, the *unique* features distinguishing this aspect of education are clearly stated by the U. S. Office of Education[3] as follows:

1. The instruction in question will provide for the development of the needed ability or skill and the acquisition of information or knowledge which will be a definite asset to a worker in this occupation.

2. The possession of this ability or skill, information or knowledge will be of more value to a worker in this occupation than to a person who is not a worker in this occupation.

3. The possession of this ability or skill, information or knowledge will, under ordinary conditions, be an asset to all workers in this occupation on the level for which training is to be offered.

Vocational-industrial education ought not primarily serve the common needs of a majority — it is *not primarily* concerned with developing hobby or home mechanics abilities, or consumer knowledge, or the like, but rather to *prepare certain individuals for employment in ways not needed by a majority of others in terms of the specific demands of that employment.*

In our so-called profession this confusion would be undesirable enough were it merely a matter of loose use of terms, or of disagreements regarding meanings. Unfortunately, it goes far beyond semantics, and a few of our resulting losses might be indicated in order to lend emphasis to the importance of this problem.

1. We can hardly hope to get the maximum well-deserved support and encouragement, either from other educators or our communities, if they do not understand what they should expect in return for their support and if we do not appear to know or agree as to what we are trying to do.

2. Because of the confusion there is a loss of efficiency in the work itself. Bickering, jealousy, ill feeling, lack of confidence, discouragement, and many other deterrents to optimum effectiveness are bred in this atmosphere. Clarification of function leads to the co-ordination and enthusiastic cooperative effort which our youth deserves and our society has a right to expect.

3. In the confusion important things often remain undone, while in other areas there is needless and wasteful duplication of effort and overlapping of function. This is the most concrete loss, and the one which is least excusable. In schools where *unsubsidized* vocational-industrial education is offered under the name of industrial arts or in confusion with it, true industrial arts is often neglected or missing altogether. In such cases, shop experiences are often provided primarily for that group of pupils who have specific employment in mind, almost totally neglecting the nonspecialized needs of *most* pupils which require shop experiences. Under present conditions, this is understandable, but inexcusable. All high school age youth, both boys and girls, should have shop activities designed to serve their important life needs. Another loss of this concrete type is found in the unsubsidized vocational-industrial work which is carried on under the stated or implied name of industrial arts. Often it is inadequately supervised and, at times, taught by persons not properly qualified. It is often unco-ordinated with the industrial employment it strives to serve, and frequently it is not evaluated in terms of its objectives, partly because its objectives in this atmosphere of confusion, are either not recognized or poorly defined, or even are denied.

How Distinguish Between Industrial Arts and Vocational-Industrial Education

Fortunately for the solution to this problem, distinguishing between industrial arts and vocational-industrial education is much simpler than the foregoing discussion might indicate. All we need do is to identify the *major purpose of the shop activity.* If it serves needs held in common by a majority of pupils it is probably industrial arts. If its purpose is to serve needs based on the demands of certain types of industrial employment, and not required by most other types of industrial employment or by nonvocational life activities, it is probably vocational-industrial education. CAUTION: Stated purposes are not always the true purposes, and it sometimes helps to examine the activities of pupils, with their likely outcomes and probable application in life.

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[1] Magill, Walter H., "The Function of Junior High School Shop Work," *Educational Outlook*, Vol. III, No. 3, Mar., 1929.

[2] It should be noted that in common usage, terms like vocational-industrial or vocational-agricultural are almost universally used to denote specialization and the adjective *specialized* need only be used for emphasis.

[3] *Administration of Vocational Education*, Washington, D. C., Office of Education, Vocational Education Bulletin No. 1, General Series 1, rev., 1948.

Industrial Arts and Vocational Education
John J. Metz, *Editor*

HOW TO OVERCOME FRUSTRATION

It frequently happens that one reads about handicapped persons who, in spite of their affliction, render outstanding service to others. A case of this kind was reported in an article which appeared in the Rochester, N. Y., *Democrat Chronicle*, and was then made a Civil Air Patrol release.

The heroine of the story is Elizabeth Lauer who has been confined to her bed for eleven years. She felt that life was unbearable unless she was assisting in some undertaking that would be of benefit to others. Through the job she assumed, she may be the first shut-in in the nation to join the Civil Air Patrol.

Her job is to put the local air force auxiliary branch "on the air" during the daytime by keeping radio contact with CAP autos, airplanes, and area airports. This woman, confined to her bed, has assumed a job that, up to now, remained undone because CAP members have their own jobs in business and industry to attend to during the daytime.

One hears so much of frustration nowadays, but Miss Lauer did not allow herself to become frustrated. She used the common sense with which she had been endowed, and cast about until an opportunity offered to make use of what strength she has, and then used her will power to keep on a job from which her community, her state, and the country at large, profit.

It is well to place such an example before the students of your classes. It is true, this particular bit of information does not belong to shopwork per se, but it will show the members of your classes a better method of meeting adversity, suffering, and disappointment than to follow the easy road of allowing one's self to become frustrated.

Our forces in Korea keep on fighting even though, according to reports, they are not provided with enough of the proper kind of ammunition. Merely allowing themselves to succumb to frustration would quickly give the victory to the enemy.

EDUCATIONAL TELEVISION

Education seems to be confronted with a difficult problem of obtaining television channels for educational purposes. Dr. Rettaliata, president of the Illinois Institute of Technology, recently pointed out in a press conference that when Chicago obtains an educational station, thousands, if not millions, can continue studying and learning in their homes.

A little observation shows how this new method of transmitting information and entertainment acts upon the school children. See how many youngsters are strutting about with toy gun holsters on their hips. See how they have copied the swagger of their western gunmen heroes. Ask them where they have acquired their knowledge about all of these things and they will quickly inform you that they watch TV. The questioner will also be surprised at the hours which some of these children spend watching their favorite programs on the TV screen.

It is truly surprising that adults, especially parents, do not awaken to the fact that some of these television programs are far from being harmless for their children. Yet these same grown-ups deplore the fact that some channels should be turned over to educational institutions rather than to permit them to get them into the hands of commercial broadcasting stations.

It is heartening to see, however, that some cities are beginning to make strenuous efforts that this — the latest of the almost miraculous transmission methods — be turned over to the schools. In some of these cities big industrial firms are taking a sane view of this matter, and they are raising money to enable the schools to make sure that the educational channels offered by the Federal Commission will not be turned over to private enterprise.

In Chicago, for instance, Edward L. Ryerson, chairman of the board of Inland Steel Company, accepted leadership of a committee to raise at least $500,000 to make sure Chicago does not lose Channel 11 as an educational television station.

Other members of the committee are: Dr. Robert E. Wilson, chairman of the board, Standard Oil Company of Indiana; Guy Reed, executive vice-president, Harris Trust and Savings Bank and a member of the Little 19 committee; James D. Cunningham, president, Republic Flow Meters Company; and Harold Swift, chairman of the board, Swift and Company.

Then, too, many local citizens and organizations have pledged their support. In addition, the Ford Foundation has promised to contribute $150,000 if the community gives at least twice that amount; and the Chicago board of education has earmarked $150,000 to convert space in Manley Vocational High School, 2900 W. Harrison, for the proposed station's studios.

The Chicago Educational Television Council will serve as the governing body for the proposed station. This organization will be developed to include representatives of all civic, educational, and cultural activities within the signal area of the station.

In setting up provisions for educational television stations, the FCC specified that the stations must serve the educational needs of their communities by broadcasting educational, cultural, and entertainment programs to the general public, and that all recognized educational institutions in the area must be given the opportunity to participate.

YOUR NEW ADDRESS FOR 1953–1954

Annually many copies of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION go astray because the September number is sent to addresses that are no longer correct.

Such copies cannot be replaced because increased material and labor costs make it necessary for us to keep press runs as low as possible.

Will you, therefore, kindly send your new address to our circulation department no later than August 15.

REFINING RATE INCREASED

The refining phase of the oil industry set a new operating record in 1952. Refinery runs averaged 6,670,000 barrels daily during the year. The forecast for 1953 is even higher.

Project Design for Teachers

ALEXANDER F. BICK
Milwaukee, Wis.

(Continued from page 160 of the May, 1953, issue)

Developing a good candlestick design is divided into two distinct steps:

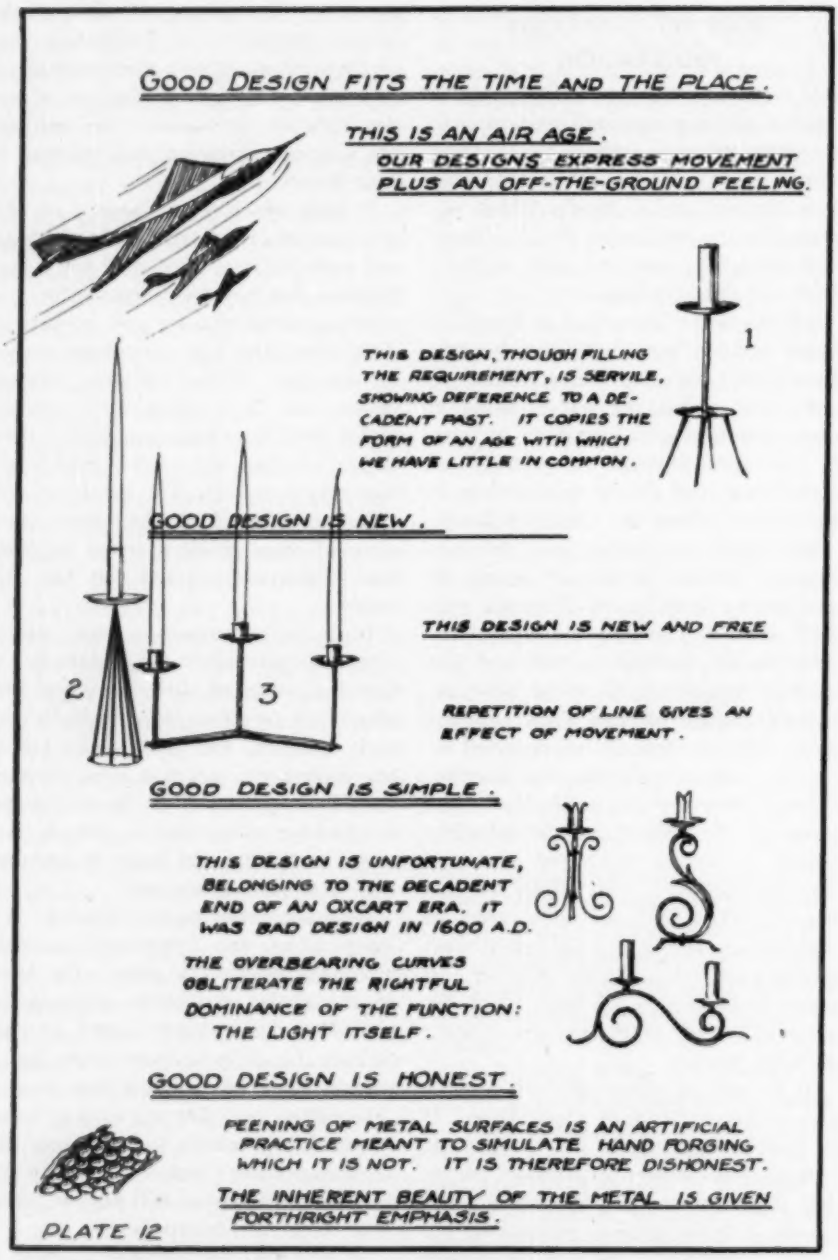
1. Making it practical for use, and
2. Giving it the form of the time and the place.

Plate 12 illustrates the procedure toward the objective of step 1, and Plate 13 does the same for step 2.

Step 1 is engineering; step 2 is art; an exercise of *common sense*, for it involves modifying the practical form until it has some of the earmarks of our day. The most evident symbols of the time are speed of communication, the airplane, jet propulsion, atomic fission, the machine, etc. To fit a boy for a prom, you comb his hair and put him in a coat with a boutonniere. The process is about the same in fitting a metal candlestick for the age, you attach to the basic form a symbol of time.

Good design is spontaneous and inventive, yet a professional designer will not claim such originality as will give you the false impression that he draws his ideas from intellect alone. He uses a system of voluntary inspiration. Here is the method which everyone may try with profit:

1. Select a quiet week-end hour.
2. Provide a comfortable place to sketch, as for instance, an upholstered chair at a card table near a window with just the right light, a sharp soft pencil, and friendly paper, the absence of any of which may spoil the day. Turn off all extraneous sound because you are going on a special mission where quiet is imperative.
3. Select a professional source, for example, the *Interiors Magazine*, November, 1952. This number, used in the preparation of this article, may be borrowed from a local interior decorator or from a public library.


GOOD DESIGN FITS THE TIME AND THE PLACE.
THIS IS AN AIR AGE.
OUR DESIGNS EXPRESS MOVEMENT PLUS AN OFF-THE-GROUND FEELING.
1
THIS DESIGN, THOUGH FILLING THE REQUIREMENT, IS SERVILE, SHOWING DEFERENCE TO A DECADENT PAST. IT COPIES THE FORM OF AN AGE WITH WHICH WE HAVE LITTLE IN COMMON.
GOOD DESIGN IS NEW.
THIS DESIGN IS NEW AND FREE
2
3
REPETITION OF LINE GIVES AN EFFECT OF MOVEMENT.
GOOD DESIGN IS SIMPLE.
THIS DESIGN IS UNFORTUNATE, BELONGING TO THE DECADENT END OF AN OXCART ERA. IT WAS BAD DESIGN IN 1600 A.D.
THE OVERBEARING CURVES OBLITERATE THE RIGHTFUL DOMINANCE OF THE FUNCTION: THE LIGHT ITSELF.
GOOD DESIGN IS HONEST.
PEENING OF METAL SURFACES IS AN ARTIFICIAL PRACTICE MEANT TO SIMULATE HAND FORGING WHICH IT IS NOT. IT IS THEREFORE DISHONEST.
THE INHERENT BEAUTY OF THE METAL IS GIVEN FORTHRIGHT EMPHASIS.
PLATE 12

a) Open the magazine on your table, take paper and pencil.

b) Fix your mind on the ideas "candlestick" and "metal," and be aware of the technical processes you may want to teach. Otherwise, free yourself of all influence except that which may now strike your eye.

c) Page through the magazine and sketch whatever happens to suggest a new idea for the metal candlestick.

The drawings in Plate 13 illustrate this process, namely:

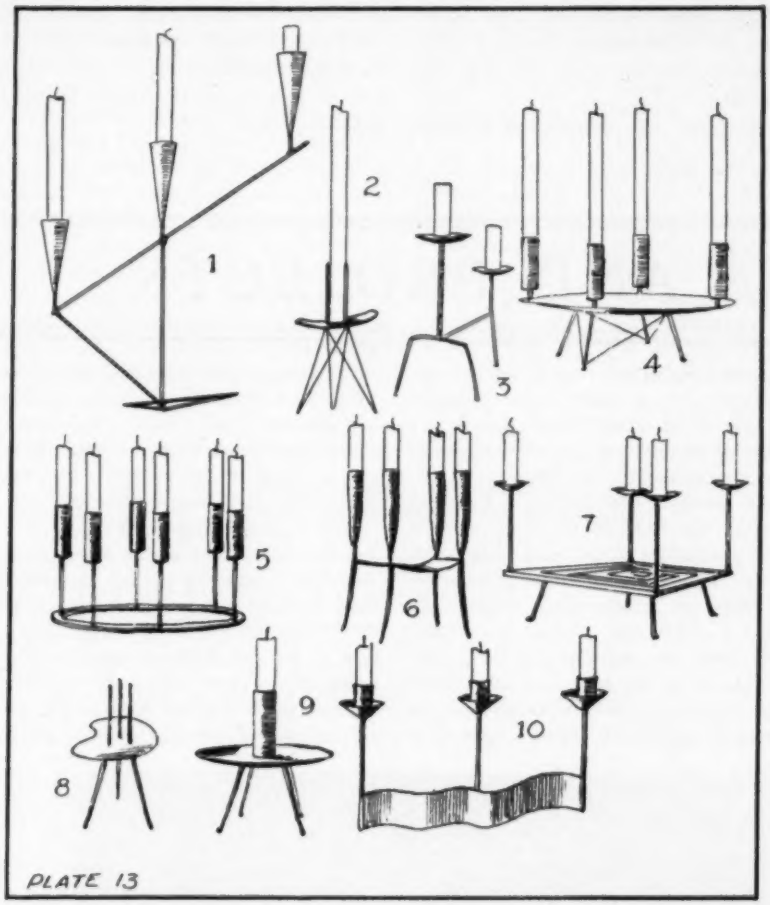


PLATE 13

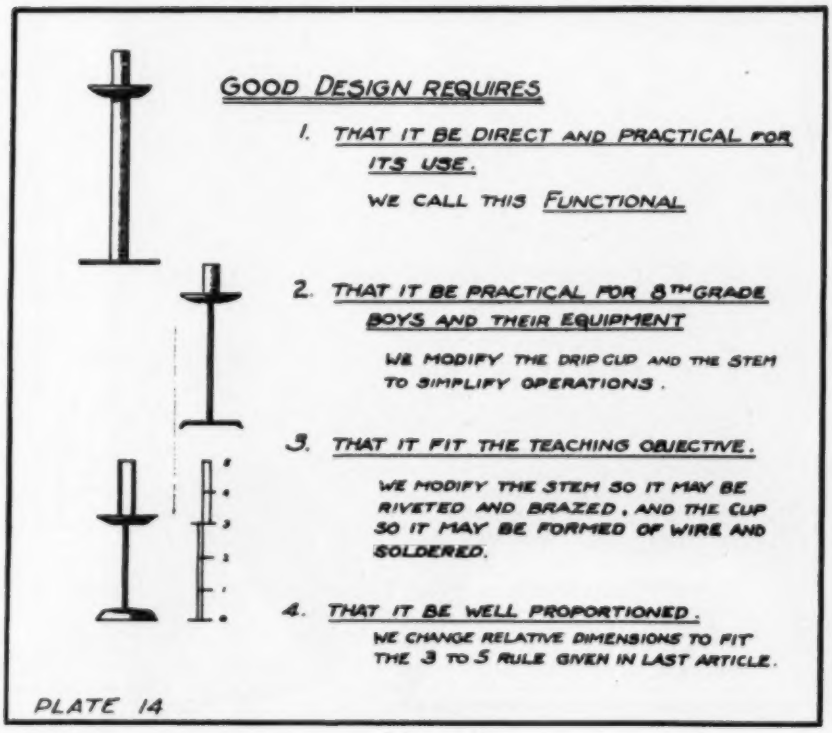

GOOD DESIGN REQUIRES
1. THAT IT BE DIRECT AND PRACTICAL FOR ITS USE.
WE CALL THIS FUNCTIONAL
2. THAT IT BE PRACTICAL FOR 8TH GRADE BOYS AND THEIR EQUIPMENT
WE MODIFY THE DRIP CUP AND THE STEM TO SIMPLIFY OPERATIONS.
3. THAT IT FIT THE TEACHING OBJECTIVE.
WE MODIFY THE STEM SO IT MAY BE RIVETED AND BRAZED, AND THE CUP SO IT MAY BE FORMED OF WIRE AND SOLDERED.
4. THAT IT BE WELL PROPORTIONED.
WE CHANGE RELATIVE DIMENSIONS TO FIT THE 3 TO 5 RULE GIVEN IN LAST ARTICLE.

PLATE 14

Collecting design ideas

Design 1. A candlestick inspired by Designer Sarfattis' geometric wall lighting, a composition of lights and arms, page 91, *Designer's Magazine*, November, 1952.

Design 2. A small candlestick inspired by the design of the seat on page 129.

Design 3 comes from the idea embodied in the metal base of the chair on page 129.

Design 4 comes from the bowl on page 130.

Design 5 takes its cue from the enclosure on page 131. Our design may seem farfetched to you, but in this case, the idea of a partial closure suggested a metal ribbon surmounted by lights. After several trials, this finally boiled down to the design given in 5.

Design 6 comes from the stool on page 140.

Design 7 originated in the table on page 145.

Design 8 from a suggested candle base in the advertisement on page 148.

Design 9 from an inverted light advertised on page 148.

Design 10 is taken from a decorative form on page 156.

It is plain, therefore, that one is free to extract the essence of an idea from a table or other unrelated object, and attach it to the metal candlestick idea. It is also obvious that the designer is free to, and he does, modify the original idea without regard for its inviolability. He shapes and reshapes it for his best use, even though it might be modified beyond recognition, if the second modification suggests a better third form. The process is entirely free and opens the design field wide. Do not expect to be expert at the first or the fourth try, but do not abandon this gold mine of ideas short of success.

Method

The technical process in mind during the development of designs in Plate 14 was, first, drilling and insertion of one piece into another, the former being filed with a shoulder; and second, brazing. The materials to be used are brass or iron.

Brazing of the type here recommended may well revolutionize your shop procedures. It is simple; and seventh-grade boys do it without difficulty, using a bench type Johnson two or three burner furnace or a large Bunsen burner with mouth air pressure. We recommended Handy & Harmon's fluorite flux and their Easy-Flo wire brazing alloy.

Furthermore, we suggest the pressing of all candle cups, using hardwood dies. They are efficient for thicknesses up to 14 gauge annealed iron or brass, and they may be quickly made by hand if machines are not available.

PROBLEMS AND PROJECTS

THE HALL DISPLAY CASE

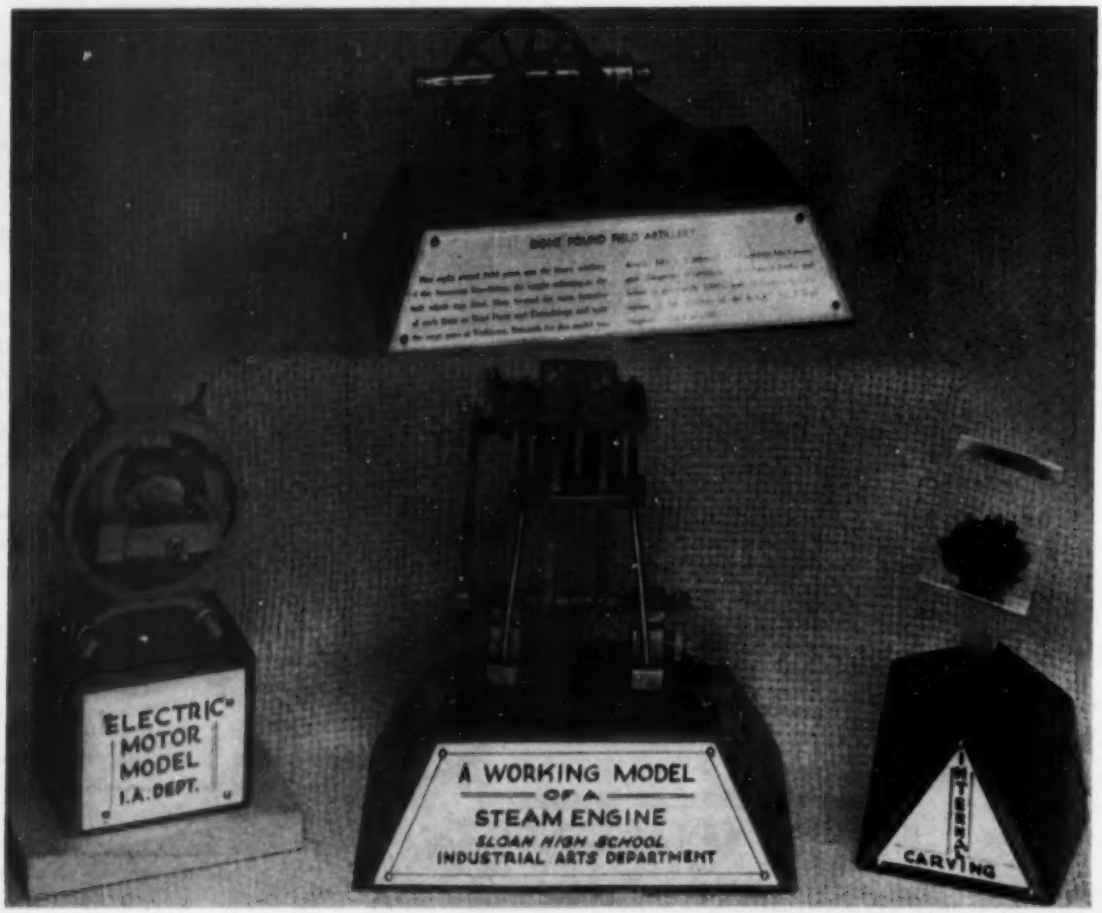
CHARLES H. MIECZNIKOWSKI
Instructor of Industrial Arts
Sloan Public School District No. 9
Cheektowaga, N. Y.

One of the ways in which to publicize the work done in an industrial-arts department is to present projects produced in the school shop in an exhibit cabinet in an eye-catching manner. Too often we industrial-arts teachers will take it for granted that pupils and those visiting our schools will rush to see our display of projects. In many cases, however, people rush by the cabinet where projects may be exhibited because the projects are placed there in a commonplace manner.

Usually people admire the beautiful athletic trophies in the hall cabinet. They stop to read the inscriptions on the name plates. This gave the writer the idea to mount some of the projects on wooden bases or pedestals whenever it can be appropriately done. Then, the boy's name or a description of the project can be placed on the base as a name plate. Models of boats, airplanes, or automobiles are *a natural* for being mounted on a base.

Variously shaped bases, or pedestals, need not be time consuming nor expensive to make. Odd pieces of wood, plastic, metal, etc., from accumulated short stock, or from the scrap box will furnish the material. The wooden blocks are cut to shape which will suit the project most advantageously.

Some of the boys in the shops who have made an outstanding project and who may want to leave the project for a permanent display will have a special pleasure to know that it will be displayed prominently. The writer usually gives the boy the material from the shop gratis if he will make another project for the display cabinet. In this way, he al-



— Photograph by Don Jay Studios, Inc., Lancaster, N. Y.

ways has projects in his display cabinet, so that, whether during a change of classes, or during summer vacation, chance visitors will not see an empty cabinet.

The industrial-arts teacher who has a general shop, may find this idea of displaying the work of his students very useful. A pupil in the general shop has a chance in using several materials in making up one of these bases. A piece of metal may be used instead of the plastic for the name plate. Even tooled leather would, in some cases, be appropriate. A description of the project could be set up in type, or printed with a ball-point pen. A pupil has a varied choice in design, material, and ingenuity.

PLASTIC KEY HOLDER

E. R. GLAZENER
Industrial Education Dept.
Arkansas A. & M. College
College Heights, Ark.

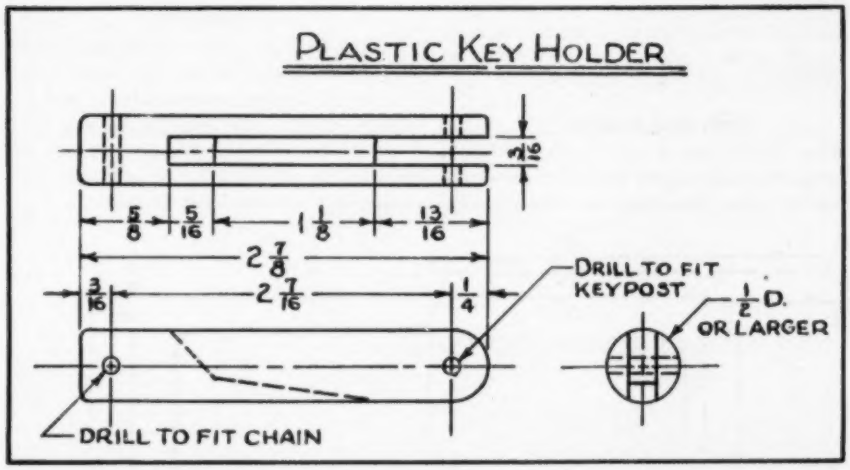
The plastic key holder shown and described herewith is small in size and inexpensive. Yet it will give the beginner experiences with some fundamental operations and related material on plastics and also produce a usable project. It may be used in the crafts area of the general shop or as a supplementary project in practically any type of unit shop where extra time is limited for introducing other work.

The materials list is shown for a holder to fit two keys, but the size of the key post and plastic rod may be chosen to fit a larger number of keys.

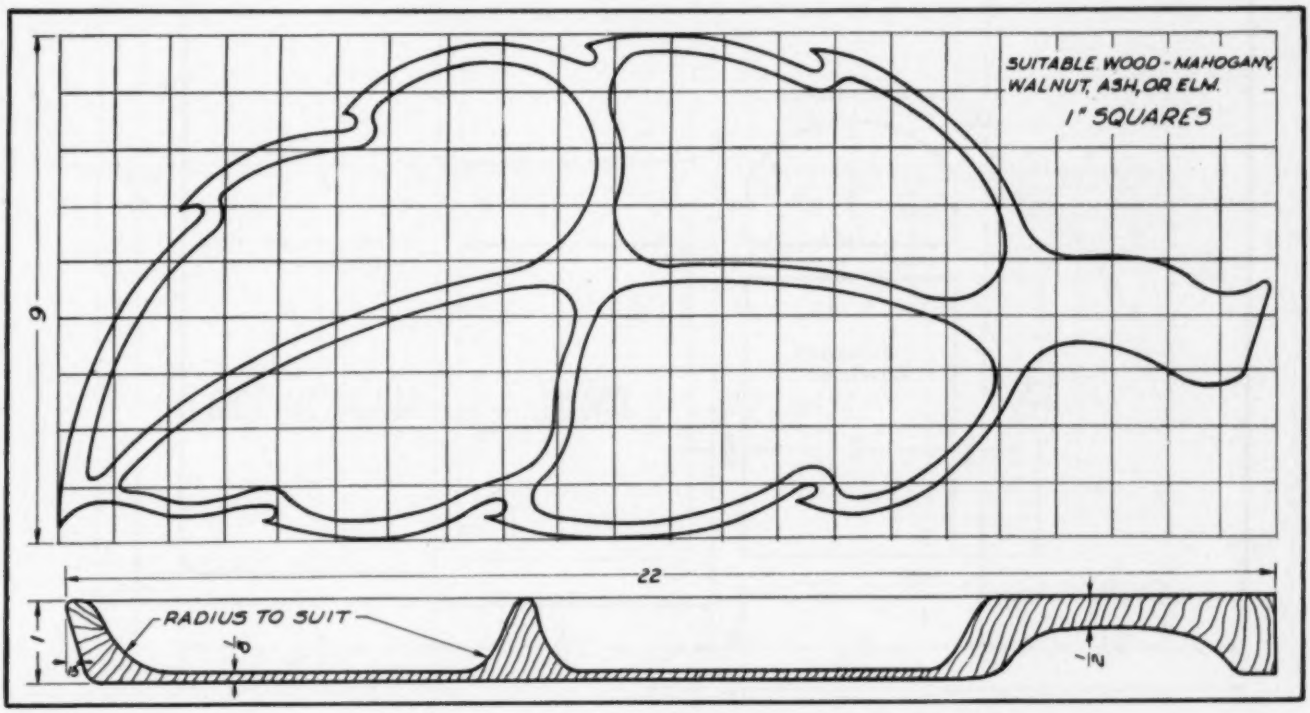
MATERIALS AND SUPPLIES	
Plastic rod	½ by 2⅞ in.
Key post	½ in.
Key chain	Length desired
Polishing compound	

Procedure

1. Secure the size of plastic rod desired.
2. Using the hack saw, saw off stock as necessary, allowing approximately ⅛ in. extra for rounding and smoothing ends.
3. Lay out for the holes and drill, using the hand drill and twist drill to fit key post and chain.
4. Add one or two extra saw blades to the hack saw, then lay out and saw slot.
5. Grind ends to rough shape if desired, then file and sand out all marks and scratches.
6. Polish well with tripoli and rouge on the buffing wheel. Pumice and rottenstone may be used and all polishing done by hand.
7. Assemble the key post and chain for the finished holder.



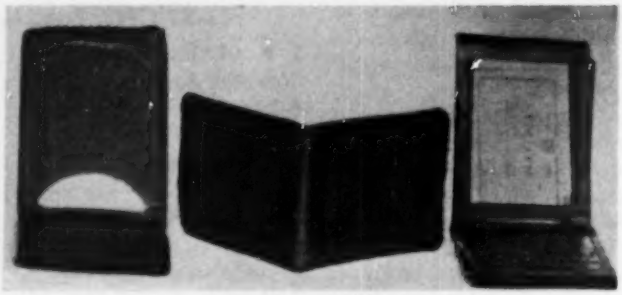
Within the last 25 years, hydrocarbons from petroleum and natural gas have become a source of raw materials for more than 2500 different chemical products. — *Petroleum Newsnotes.*



Carved oak leaf tray. Louis Barocci, Cudahy High School, Cudahy, Wis.

ONE PIECE BILLFOLD

E. R. GLAZENER
Industrial Education Department
Arkansas A. & M. College
College Heights, Ark.



One piece billfold

Leatherwork is a medium in the curriculum which lends itself particularly toward developing leisure-time or avocational interest. Attractive, useful projects result in accomplishing a part of several industrial-arts objectives.

The billfold is one of these practical projects which nearly everyone usually makes. Many activities, operations, and related information can be taught or learned with a small amount of equipment and supplies.

The one piece billfold, illustrated and described in this article, results in about as much planning, designing, laying out, tooling, and other operations and processes as the usual one- and two-fold types. It has one particular use advantage over other types. The lacing is not bent in a fold to eventually wear and break before the article has fully served its useful purpose.

MATERIALS

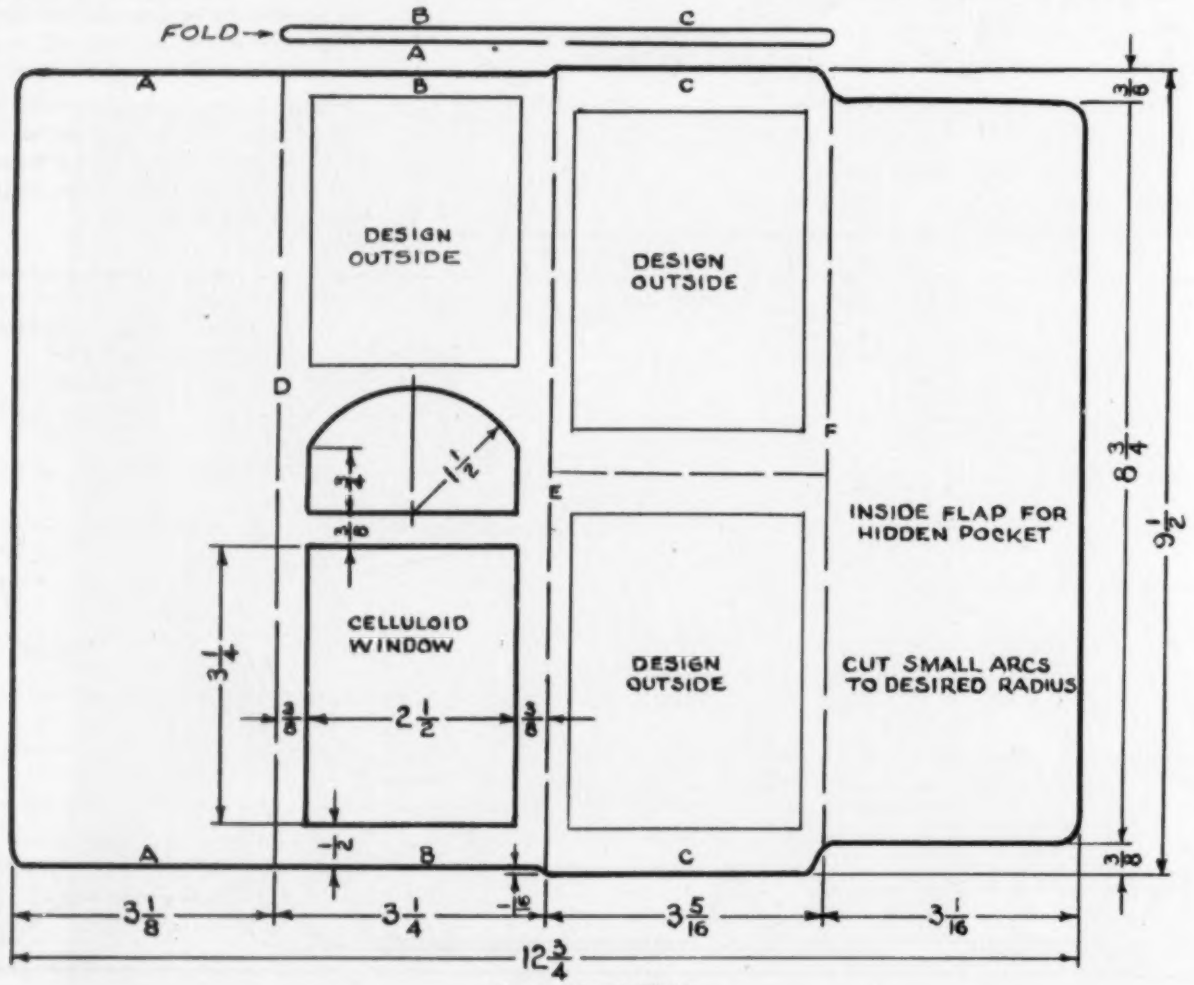
1 pc. natural tooling calfskin	9½ by 12¾ in.
Goatskin lacing	3/32 by 40 in.
Celluloid	3 by 3¼ in.

Tools and Supplies

Rule, square, tracing tool, scissors, dividers, skiving knife, hole spacer, hole punch, assorted modeling tools depending on design to be tooled or carved. Desirable supplies include leather bleach, dye, a lacquer type preservative, wax, paper clips, and rubber cement.

Procedure

1. Draw full size pattern with design to be carved or tooled. Do not use lined paper.
2. Secure leather, attach pattern, and cut outside edges to size with the scissors.
3. Lay out internal openings and cut out with the skiving knife or other cutter. This should be the finished size of material.



Layout for billfold

4. Attach pattern with design to hair side, using paper clips, dampen flesh side of leather and trace design onto leather.

5. Remove and tool the design to completion.

6. With the skiving knife, thin the edges of the leather on the flesh side where the ends of the billfold will be laced, (at *A*, *B*, and *C*).

7. Cut celluloid to proper size and sew in by hand or with some other sewing device.

8. Apply bleach and let dry.

9. Dye design and other parts as desired.

10. Apply lacquer type perservative to cover entire flesh side of leather or delay until after lacing and cover only exposed areas.

11. Fold as shown on drawing at *D*, *E*, *F*, and apply rubber cement on internal edges of ends to be laced.

12. Lay out holes and punch.

13. Lace with the desired stitch and apply wax.

The single button hole stitch will require about 40 in. for all lacing.

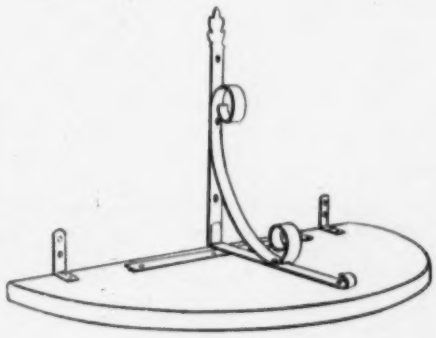
WALL SHELF

HERBERT W. YANKEE
High School
Stratford, Conn.

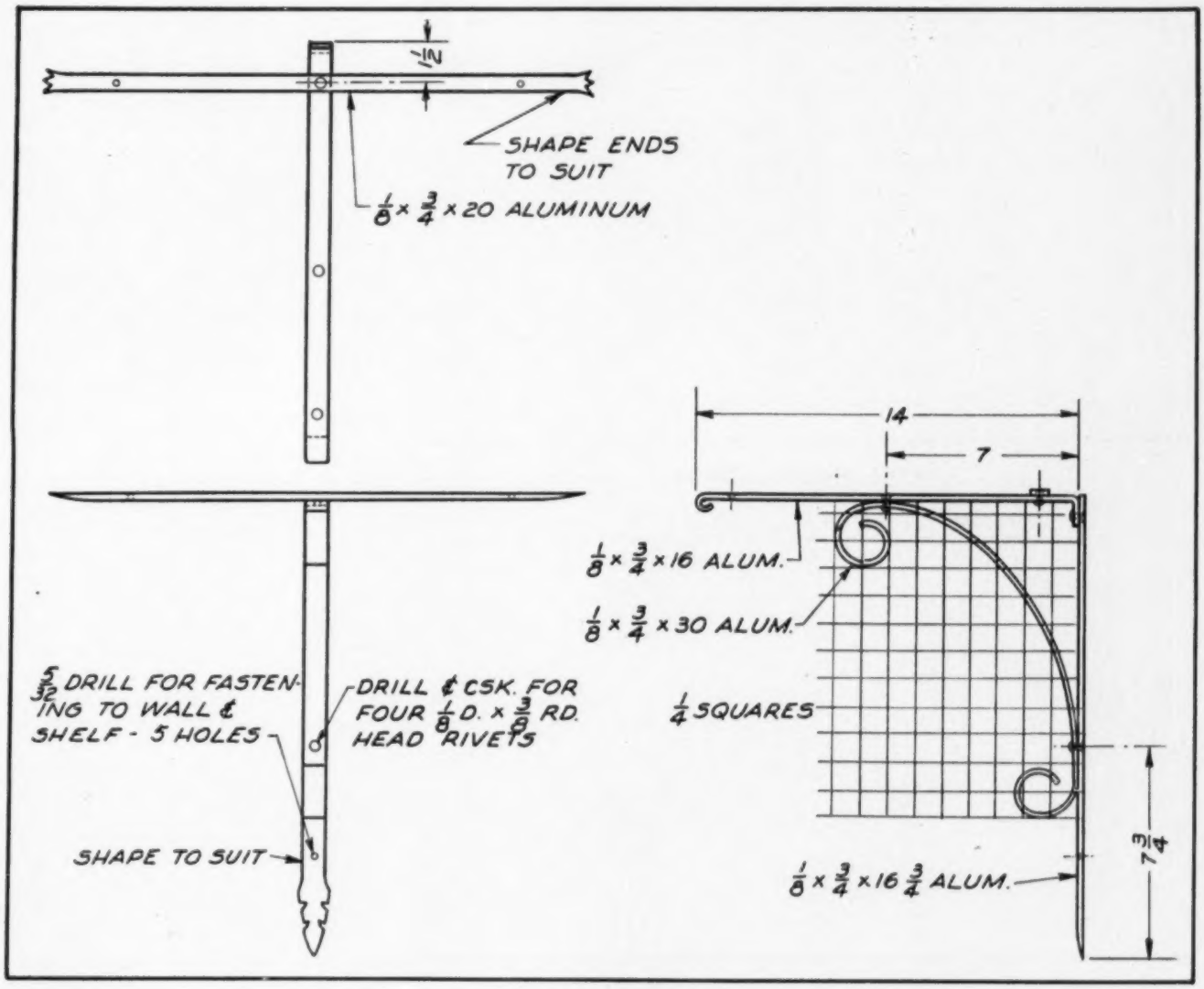
The wall shelf, especially adaptable as a project for the general shop, offers the opportunity for a pupil to work with both wood and metal. Its low cost and pleasing design make it quite popular.

The top, which was purposely not drawn, can be made of any suitable kind of stock with a recommended thickness of ⅝ in., and a radius of 14½ in. To compliment the high polish on the bracket, a high luster finish on the top is suggested.

The bracket is made of ⅛ by ¾-in. band aluminum which forms and works especially well for seventh- and eighth-grade levels. The parts of the bracket are attached with ⅛ dia. ⅜-in. r.h. aluminum rivets with the end of the rivet peened into a countersunk hole so that they do not project.



Wall shelf


1IN
SHAPE ENDS TO SUIT
⅛ × ¾ × 20 ALUMINUM
14
7
⅛ × ¾ × 16 ALUM.
⅛ × ¾ × 30 ALUM.
¼ SQUARES
5/32 DRILL FOR FASTENING TO WALL ℄ SHELF - 5 HOLES
DRILL ℄ CSK. FOR FOUR ⅛ D. × ⅜ RD. HEAD RIVETS
SHAPE TO SUIT
⅛ × ¾ × 16 ¾ ALUM.
11¾

Wall shelf

To add to the rigidity of the shelf, small braces of ⅛ by ½-in. band aluminum are attached to the underside of the top. These are bent into 1½ by 1½-in. angles.

A pleasing luster can be applied by the application of a commercial metal polish.

The wall shelf is a particularly effective project for the general shop because of the wide range of tools and operations used in making it. A summary of operations would include layout, cutting, filing, bending, hammering, forming, center drilling, drilling, countersinking, riveting, assembling, and polishing.

CONSTRUCTING SCENERY FOR SCHOOL PLAYS

CALVIN T. STOTT
Instructor of Industrial Arts
Hanover Junior High School
Hanover, Pa.

There comes a particular time of the school year when the shop instructor is called upon to construct scenery for a school play or some other school affair.

This may happen only once during the school year, then again it may happen three or four times, depending upon the amount of extracurricular activities in which a given school takes part.

The shop instructor, legally is not held responsible for the construction of scenery, since his contract is made for teaching only; however, he should feel obligated to some degree, since his shop has all the tools and the talents needed for the construction of the scenery.

There are times though, when the shop instructor must voice his opinion, if he feels the dramatic club or other clubs are infringing too much upon his daily teaching schedule.

When the time arrives for the building of scenery, it would be well if the shop instructor had all the details thoroughly planned. By assigning individual students certain jobs on the scenery, the instructor will find that more work will be accomplished and by the same token, a daily grade can be given to each student on his work. The placing of one student in charge as foreman, will eliminate much horseplay and fooling when the instructor must leave the stage to go to his shop. Most students enjoy the chance to work on scenery, so this point can be played up by the instructor who can insist that any fooling or unwarranted noise will mean dismissal from the construction gang.

There are many short cuts which help in the construction of scenery. Unbleached heavy muslin can be purchased at any department store. This is the covering used on most scenery. Other materials needed are 3-in. angle irons, 3-in. straight irons, 4 to 6 oz. carpet tacks, white pine lumber S2S ¾ in. thick, No. 10 by ¾-in. flat head wood screws, and various colors of a water base wall paint. Rip the white pine boards into strips about 3 in. wide, then cut to length for the desired size for your scenery. Any desired shape can be made by placing these strips on a flat table and cut all pieces to length. See that the pieces fit snugly together. Screw the angle irons and straight irons on all corners and braces, and the frame is then ready to be covered with the muslin. The angle irons and straight irons can be purchased at most hardware stores. Make sure each frame is braced securely so that the scenery will not shake or shudder when it is in use on the stage. The best size muslin for use on most frames will come one yard wide and is sold by the running yard. The muslin is opened and laid flat on a large table or clean floor. The frame is then placed on top with the irons placed up. Now lap one edge over one of the sides, and tack it to the frame along the entire length. After the one edge has been tacked, move to the other side of the frame and trim the muslin, allowing only enough to lap over for tacking. Pull the muslin tight as you tack. Last, do the ends in the same manner as that used for the two sides. If the material is somewhat loose,

EQUIPMENT INVENTORY

Item: _____
Dealer: _____
Address: _____
_____
_____
Inventory Number: _____

DEPARTMENT

New or Used: _____
No. Purchased: _____
Date of Purchase: _____
Purchase Order No.: _____
Vendor's Order No.: _____

DESCRIPTION	SERIAL NUMBER	COST	COST OF INSTALLATION	INVENTORY VALUE

CHANGE IN DEALERSHIP

New Dealer: _____ Transferred from: _____
Address: _____ Department
_____ Date: _____

Front of 5 by 8 in. inventory form

REPAIRS AND REPLACEMENT

DATE	DESCRIPTION	PART NO.	COST OF MATERIAL	LABOR	TOTAL

Reverse side of inventory form submitted by George W. Davis, director, The School of Industries, Virginia State College, Petersburg, Va.

don't worry about it, because the paint will take care of any loose material and will tighten the whole frame when it dries.

Any type of a rubber base water solvent paint will do the trick for color. Some of these are *spread, wallhide, Kemtone,* or even poster paint.

After the scenery has been made and erected, it is then your job or the art instructor's to lay out the art work desired on the scenery. Here again the students should be assigned to paint certain parts of the scenery. Even students of junior high school level can make and paint scenery that will both amaze you and the people who come to your school plays. However, the big secret is to organize your work and get all students interested in the project. The art instructor or you, of course, will have to put on any finishing touches which you think the scenery may need.

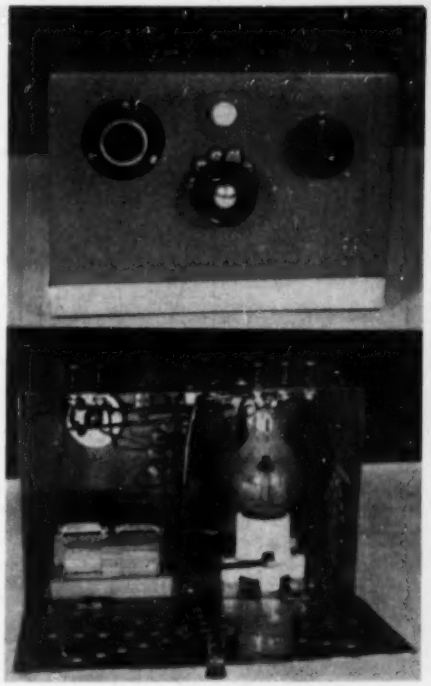
As has already been stated, not only the large panels, but all sizes and shapes of scenery for buildings, walls, furniture, and even trees and shrubs can be made by the method described. It will be found that much time will be saved by building most of the school's scenery in this way, rather than hauling in much outside furniture like cupboards and bookcases. Of course, some real furniture will be needed in every play. With the aid of a few fair artists, your stage will take on many lively and beautiful colors which will add to the fantasy of many operettas and plays.

BATTERY CHARGER

L. C. BORK
Instructor of Electronics
High School East
Wichita, Kans.

This storage battery charger is not difficult to build and is very handy in the garage to pep up the automobile battery. It will charge a 6-volt battery at a rate of six amperes and taper off to one ampere.

The most difficult part to build is to wind the coils, but the average high school boy should not have too much trouble winding them. Both coils should be wound on a mandrel 2 by 2 by 4 in. The primary contains 390 turns of No. 14 form var magnet wire.



Battery charger and case

Wind 290 turns on the mandrel and then bring out a tap, wind on 20 turns and bring out another tap, and repeat this until three more taps have been brought out, adding 20 turns between taps.

For the secondary use the same mandrel, but use No. 12 wire and wind on 72 turns, then bring out a tap, add 10 more turns which completes this coil.

The size of the laminations for the iron core should be 1½ in. wide and 5½ in. long for the core through the coils and for the ends the laminations should be 1½ in. wide and 3 in. long. The finished core should be 1½ in. by 1½ in. by 5 in. by 3 in.

The case may be made of wood or metal as desired. The bulb is a regular 6-ampere tungar tube. The ammeter should be 10 amps maximum. The fuse should be not larger than 10 amperes.

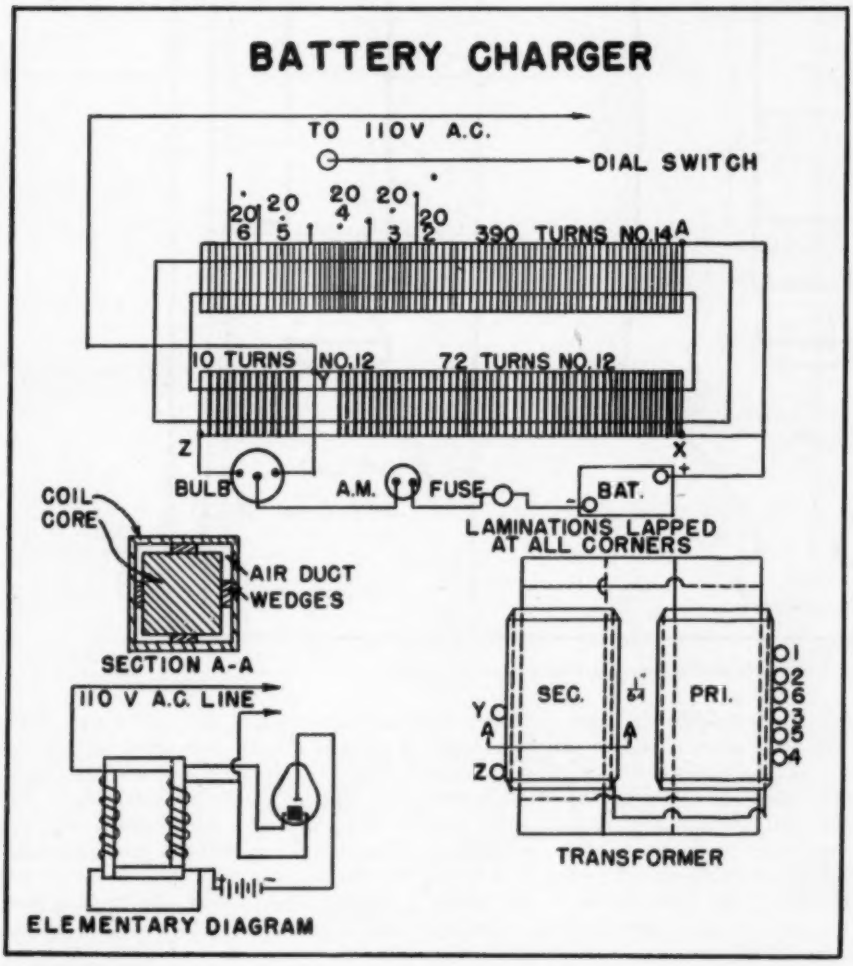


Diagram for battery charger

A WROUGHT IRON DOOR KNOCKER IN COLONIAL STYLE

J. HUGH CAPRON
Winona State Teachers College
Winona, Minn.

The interesting wrought iron project described herewith involves a variety of operations and yet can be completed with a minimum of special tools. The colonial design of this knocker will lend a note of distinction to any appropriate door.

Construction should begin by laying out

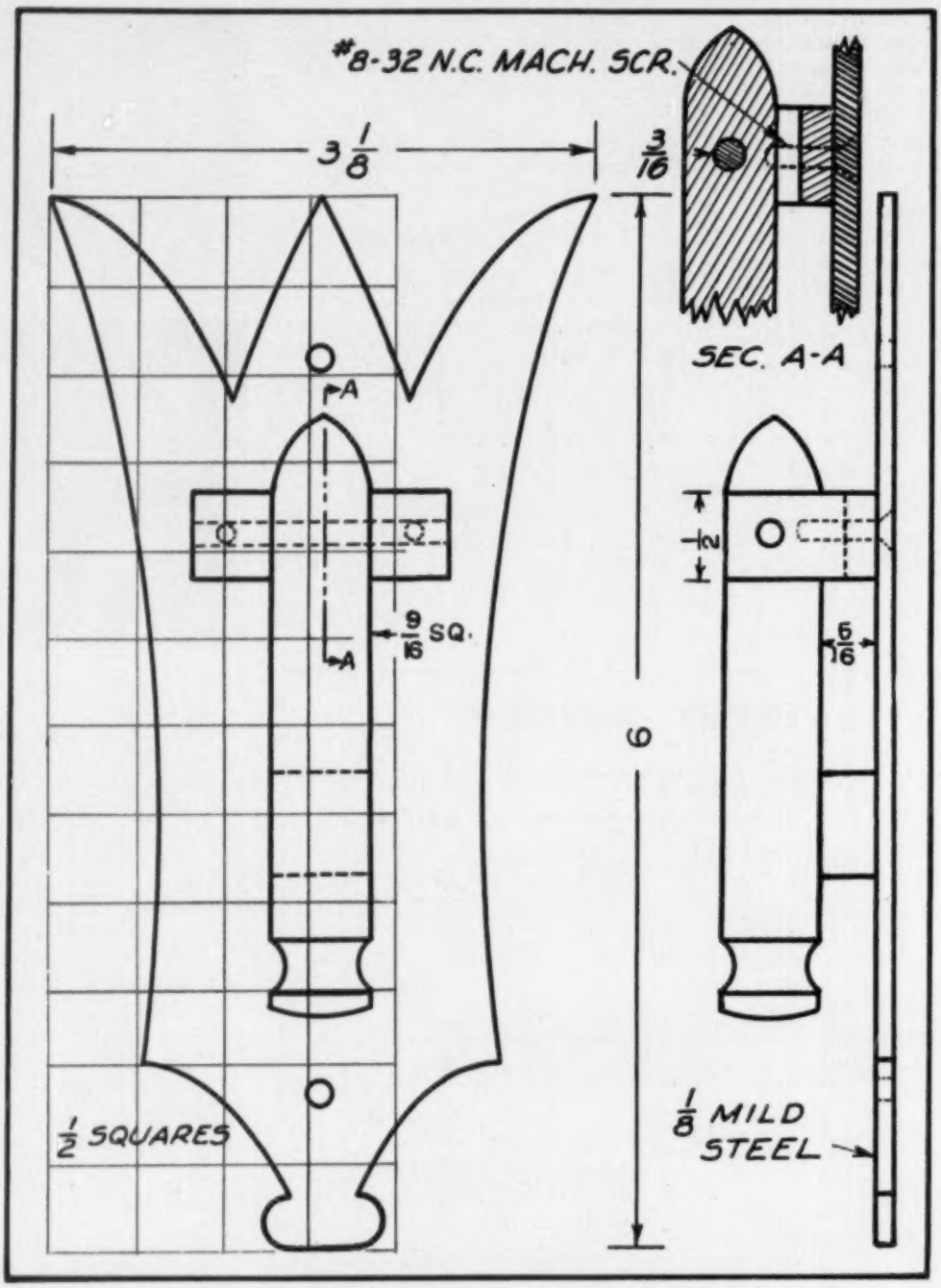
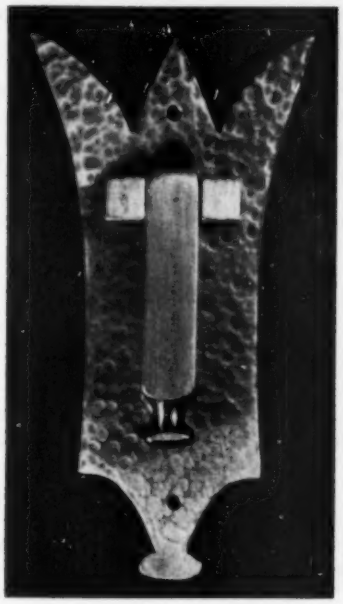


Fig. 1. Details of the wrought iron door knocker

the design of the back plate on a piece of ⅛-in. mild steel. Check to be certain that the layout is symmetrical. Proceed to cut the steel to shape by using a hack saw to remove the major portions of the stock and use files for shaping the rest. The knocker is formed from 9/16-in. square stock. A piece 3½ in. long is required. The decorative ends may be shaped with files or a grinder, or it may be done on the machine lathe. Another piece of 9/16-in. square stock 5/16 in. long is attached to the end of the knocker as shown in Figure 1. This piece serves as a head for the knocker and can be fastened into place by welding or by using two #8 machine screws. If screws are used, they should be drilled, tapped, and countersunk from the head into the knocker. The pin block consists of a piece of ½ by ⅞ by 1½-in. mild steel. The recess, into which the knocker fits, is formed in this block by using a hack saw and a drill. A saw kerf is made at the extreme edges of the recess and the excess metal is then removed by drilling a series of adjacent holes along the back edge. Clamp the pin block and knocker together and drill the 5/16-in. pin hole through both units at once. This assures proper alignment. Next, attach the pin block to the back with two #8 flat head machine screws ⅝ in. long.

After all pieces have been properly fitted, peen all parts with a small ball-peen hammer. This gives the pieces a hand wrought appearance. Reassemble the parts by driving the



Colonial door knocker

knocker pin into place and attach the pin block to the back plate

To produce an attractive finish on wrought iron, brush on a light coat of flat black enamel. When the enamel is dry, rub over the surface lightly with fine sandpaper. Apply a thin coat of wax and the door knocker is ready for use.

SPINNER TIE RACK

JULES BERTIN
Emsworth, Pittsburgh, Pa.

The spinner tie rack illustrated had proved to be a very desirable general shop project because it correlates several areas of activity. It is a good, inexpensive, project that, as well as requiring several skills, provides an opportunity for creative design in planning the bracket design. The project is planned for use at the eighth-grade level.

Construction Procedure

Spinner

1. Cut two disks of wood, approximately 2⅝ in. in diameter; one of ¾-in softwood, the other of 1⅛-in. hardwood suitable for lathe turning.

2. Glue the disks together with paper in the joint (Figure 2). Use drawing paper as it will split easily when separating the two pieces at completion of turning.

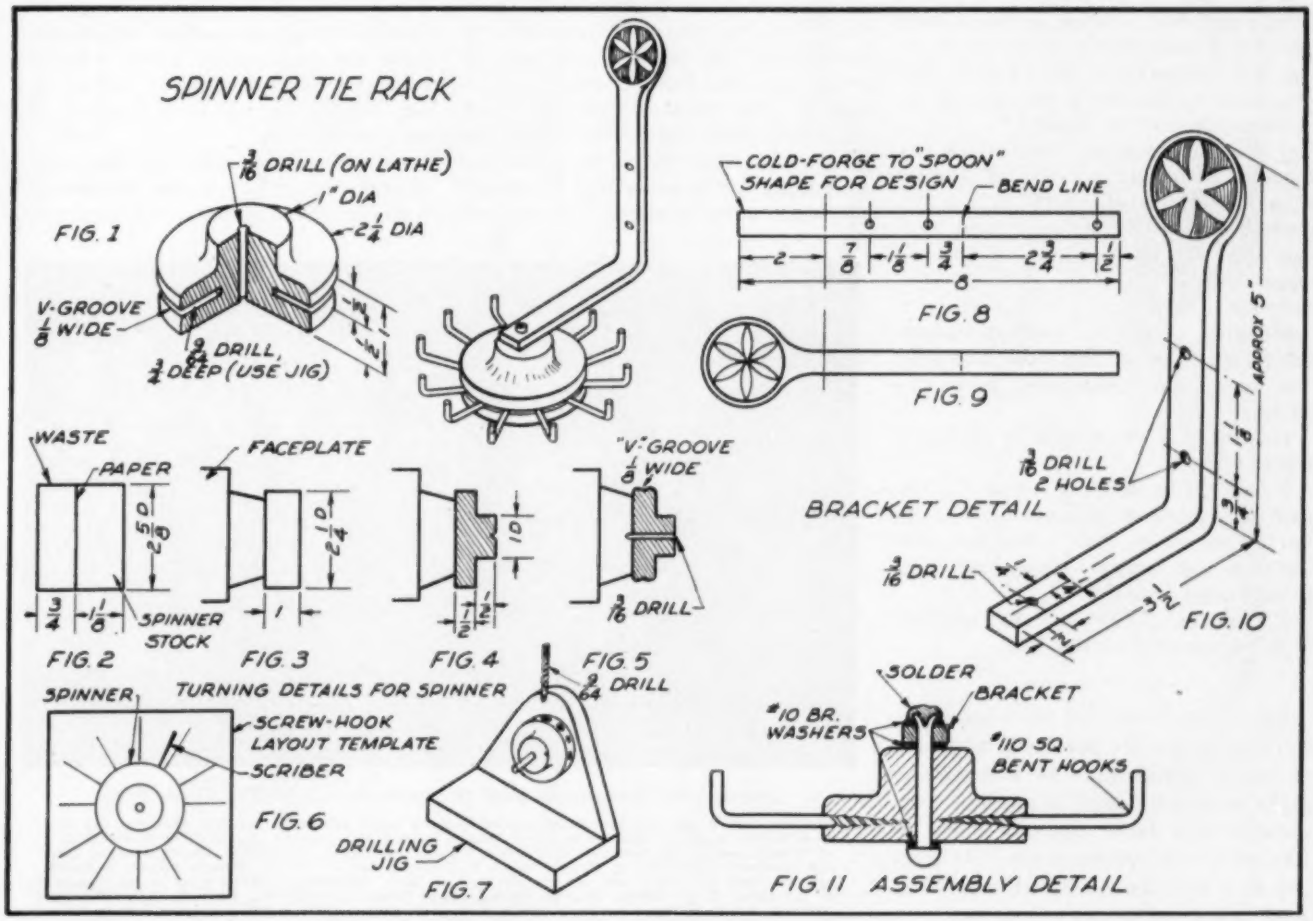
3. Mount the glued stock on a small face plate with screws of such length that screws will not go through the softwood disk.

4. Turn stock to 2¼-in. diameter; face spinner stock to 1-in. thickness; turn taper on waste stock to permit rounding corner of bottom side of spinner, as shown in Figure 3.

5. Use round-nose chisel to shape spinner; cut recess on center of face for starting drill. See Figure 4.

6. With diamond point chisel, cut a *V* groove and round off corners as shown. If drill chuck is available to fit lathe, drill the 3/16-in. center hole at this time. If not, drill, on center, after completed spinner has been removed from waste stock. See Figure 5.

7. Smooth the spinner with abrasives and finish to suit.



Spinner tie rack

8. When finish is dry, use chisel to split spinner from waste stock.

9. Remove glue and paper residue from bottom of spinner, smooth with abrasive and finish as in step 7. If lathe screw center is available, mount spinner to clean and finish bottom.

10. To locate centers of 9/64-in. holes for No. 110 square bent hooks, place spinner (properly centered) on paper template showing radial lines. See Figure 6. With scriber, prick marks in the *V* groove. These should be center-punched, lightly, before drilling.

11. To assure drilling holes for screw hooks on radial center lines, it is advisable to use the drilling jig shown in Figure 7. On the upright piece of the jig, there is a 5/16-in. pin on which the spinner is revolved for positioning properly for drilling on radial center lines.

12. Turn screw hooks into spinner, full length of screw thread.

Bracket

1. Cut one piece 1/4 by 1/2 by 8-in. aluminum bar stock. Alcoa 53ST5, or other bar stock a bit harder like 2SO, which is recommended for cold forging.

2. Lay out holes to be drilled and the bend line, shown in Figure 8.

3. Cold forge the end for design to a large spoon shape. Plan a design to suit. A bold silhouette is recommended rather than a design with minute detail. See Figure 9. The design must be such that it will blend and be an integral part of the bracket.

4. After the design has been cut out and polished, the bracket is ready for bending. Place upright part of bracket in vise between two pieces of hardwood. Bend to a right angle with a soft hammer, as shown in Figure 10.

Assembly

MATERIALS: Three No. 10 brash washers. One 5/16 by 1 1/2-in. soft iron round head rivet. The author uses nickel-plated stove bolt blanks.

1. Center drill end of rivet to simulate a hollow rivet.

2. Assemble as shown in Figure 11. The rivet should project no more than 1/16 in. through top washer. Flare hollow rivet with small ball-peen hammer. Spinner must turn freely without "wobble."

3. Flow a *gob* of solder onto the flared rivet to give appearance of a rivet head.

Oil storage tanks that resist corrosion, electrolysis and fire are being made out of bolted, glass-reinforced plastic. The tanks weigh one-fourth as much as comparable steel tanks and are made in 250-barrel and 500-barrel sizes. At present, they cost about a fourth more than steel tanks. — *Petroleum Newsnotes.*

EDUCATIONAL TEAM HELPS TRAIN NAVAL OFFICERS

HOMER C. ROSE
Assistant Head and Senior Educational Specialist
Standards and Curriculum Branch
Bureau of Naval Personnel
Washington, D. C.

During July of 1952 for the sixth consecutive year, the navy, in co-operation with Northwestern University, conducted an orientation course for naval officers. These officers have been designated as instructors and professors of naval science in 52 colleges and universities providing naval officer training in the Naval Reserve Officers Training Corps program.

The orientation course is designed to provide instruction and experience in four areas: functional speech, administrative procedures, educational psychology, and educational procedures.

The educational procedures part of the orientation course consists of conferences on methods of instruction, testing, training aids utilization, lesson planning, and practice teaching. For this instruction the large group of approximately 140 officers is divided into seven sections each under the supervision of a member of the educational procedures staff.

The instructional staff is drawn largely from Northwestern, other NROTC universities and colleges, and the Bureau of Naval Personnel; however, a number of educators are employed as individuals because of the particular contribution they can make to the program.

A significant feature of the training is the practice teaching. Each officer prepares and presents several types of lessons. These lessons are analyzed and evaluated by members of the class. Naval officers have found this experience so helpful that the time devoted to practice teaching has been increased each year.

Educational Procedures Staff at Northwestern NROTC Conference

Front row, left to right: Homer C. Rose, assistant head and senior educational specialist, Standards and Curriculum Branch, Bureau of Naval Personnel; L. Braaten, training aids specialist, Bureau of Naval Personnel; R. W. Trimble, training aids specialist, Great Lakes, Ill.; E. C. Estrabrooke, educational director, American School and American Technical Society, Chicago, Ill.; J. A. Dickinson, dean of students, Carnegie Institute of Technology, Pittsburgh, Pa. — *Rear row, left to right:* Lt. L. V. Tracy, assistant professor of naval science, University of Minnesota; G. R. Balling, principal, Michael Byrne School, Chicago, Ill.; Harry G. Bergner, training specialist, Bureau of Naval Personnel; Robert W. English, professor of industrial education, Southern Illinois University; Burton Wright, Jr., training specialist, Marine Corps, Washington, D. C.

RED FOX

BEN HUNT
Hales Corners, Wis.

While the carving of this shrewd red fox may seem to be rather complicated, nevertheless, it is comparatively simple, since there is a minimum of detail. This figure should have a streamlined effect. Cut the silhouette out of a piece of 1 3/4-in. pine or bass. See Figure 1. Figure 2 is a full-size pattern.

There are several ways of whittling this fox. It can be done roughly and left that way as shown at *A* in Figure 3, but the cuts should be made carefully, if the figure is to be left in the rough, so that each cut tells its particular story. The eyes are mere slits.

If, on the other hand, you wish to finish it up as shown at *B* in Figure 3, the whittling should be done more carefully, and the piece should then be thoroughly sanded. A crooked knife comes in very handy in whittling this fox. Don't leave any sharp edges or any sharp indentations.

For finishing, give the entire piece a coat of shellac to act as a primer and then give it an over-all coat of "cherry red" auto touch-

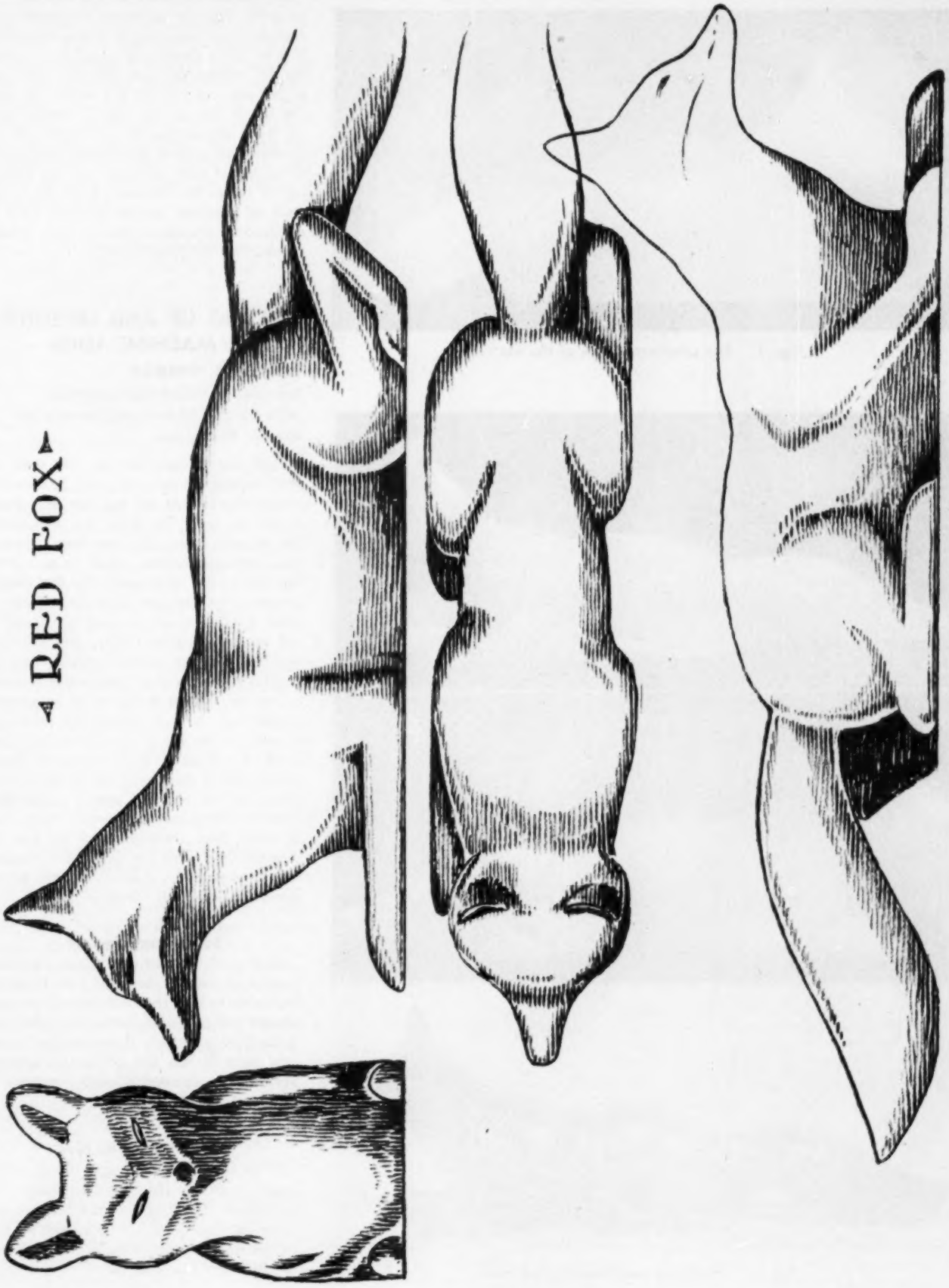


Fig. 2. Full-size pattern of red fox

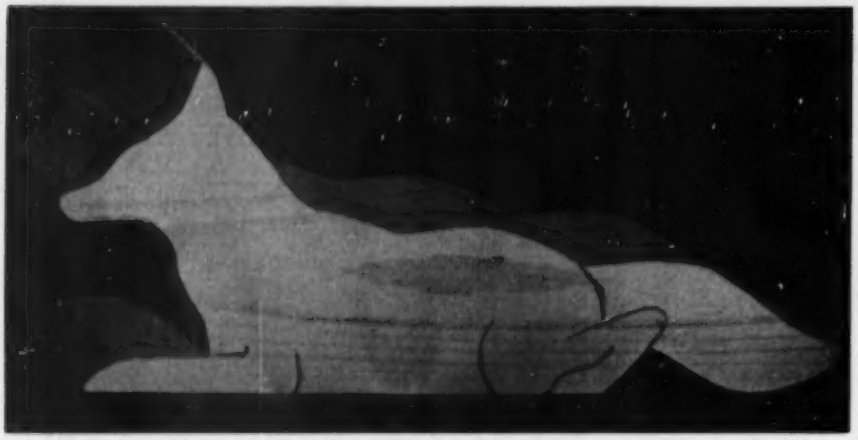


Fig. 1. The silhouette block of the fox

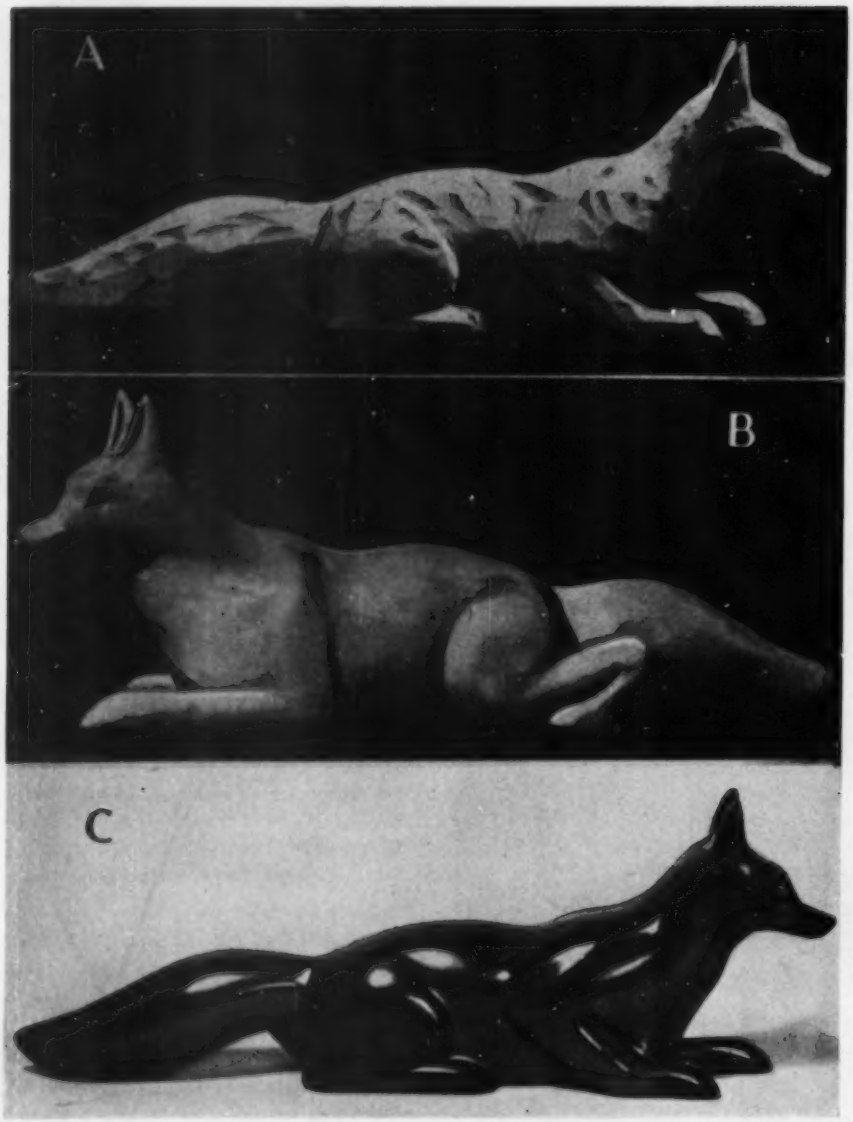


Fig. 3. Whittling and finishing the fox

up paint. This can be bought at almost any auto dealer or auto supply house. You may wish to use a darker color, such as maroon, but the "cherry red" looks very fine. The tips of the ears, and feet, the eye indentation and the tip of the tail are black, blended into the red as may be seen at *C* in Figure 3. Two, or even three coats of the touch-up paint may be used. The more the better, but the blending or rather the touching up of the black ends are important, as they give the piece a professional appearance. An air brush would be ideal for the black paint.

SETTING UP AND LEVELING A MACHINE TOOL

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Specialist in Vocational Education
United States Educational Foundation
Manila, Philippines

Upon first thought this job may seem of small importance and that it can be done by anyone with average skill and knowledge. Such is not the case. The author has seen many fine machine tools that have been unknowingly damaged beyond repair because they were not leveled up properly. For that reason precise instructions for doing the job are in order. It is customary to compare a machine tool to an automobile. Perhaps this is due to the fact that the modern machine tool is controlled by a series of levers which actuates a gear train similar to that in an automobile transmission. A better comparison would be to that of a fine watch! A machine tool in the hands of a skilled operator will cut to limits closer than a thousandth of an inch. This dimension can be more readily appreciated when we realize that the average human hair is about three thousandths of an inch in diameter. Too often the ability of a machine tool to work to its guaranteed limits is destroyed the day it is bolted to the floor.

Solid Floor Required

First of all the floor upon which a machine is to be set must be absolutely firm. It will be impossible to keep the machine level, no matter how well the job of leveling has been done if the floor is springy. If the machine is not kept level it will not perform accurately. Therefore, a permanently solid foundation is of utmost importance.

Machine Must Be Level

If the machine is not leveled it will not set evenly on all floor bearing points, usually four in number. The weight of the machine will cause the base casting to be at least slightly twisted which, in turn, will affect the alignment of the entire machine. But it is this *slight*

twist which impairs its accuracy. This is especially true in the case of engine lathes. Although the bed is heavy it can be sprung permanently by the weight of the lathe itself. The lathe bed twists by its own uneven support. This, in turn, throws the headstock out of alignment with the bed. This causes the lathe to turn and bore taper no matter how many adjustments are made or how skillful the operator may be.

Precision Level Necessary

A precision level should be used to do the job properly. A carpenter's level or combination square level is not sensitive enough. The precision level should be at least a foot long and show a distinct movement of the bubble when a 0.003 inch shim is placed under one end. The price of such a level is small compared to the damage that can be done to a fine machine tool when using any level that may be on hand.

Two Methods of Leveling

One of two methods will be employed in leveling and fastening a machine tool. Either the machine must be leveled by means of shims or by leveling screws. The latter method is the more satisfactory. Many of the modern machines now have leveling screws incorporated in their design, which greatly simplifies the job of leveling. Moreover, it is an easy task to re-level at periodic check periods. Therefore, it is best to make leveling screws and squip those machines that do not have them. A simple design for various sizes of machines is shown in the drawing. For those shops that do not have the facilities or the inclination to make these the following procedure is offered when shims are used.

Leveling and Fastening Using Bolts and Shims

The tools and equipment required to do this are a precision level, two matched parallels, metal shims or long tapered wooden wedges, lag bolts, washers, center punch, heavy hammer, crowbar, and if the machine is to be fastened to a concrete floor, expansion shields and a star drill.

The instructions given apply to an engine lathe, but the idea is the same for any machine tool.

1. Place machine at the precise spot it is to be bolted.

2. Using the bolt holes in the base as a template, drive punch marks deeply into the floor. Do this carefully or it will be found later that the bolts do not line up.

3. Move the machine aside so as to have working space around each punch mark.

4. If the floor is wood, drill the correct size hole for the lag bolts. If the floor is concrete drill correct size of hole for the expansion shields. Place expansion shields in holes.

5. Move the machine back into place so that machine holes line up with floor holes.

6. Slip a washer over each lag bolt. Drop each bolt into its respective hole. Give each bolt two or three complete turns.

7. Using crowbar or other suitable lever, raise the machine and place shims or wedges under each bolt pad. Shims or wedges should be notched to allow them to pass on both sides of the bolt. This will give equal support on both sides of the bolt.

8. Place two parallels on the front and rear *flat* ways as near the headstock as possible.

9. Place level across parallels and at right angles to length of lathe. *It is of utmost importance that the level does not touch the V ways.*

10. Raise the low side of the machine by adding shims or by driving the wedges until the bubble is in center of the level glass.

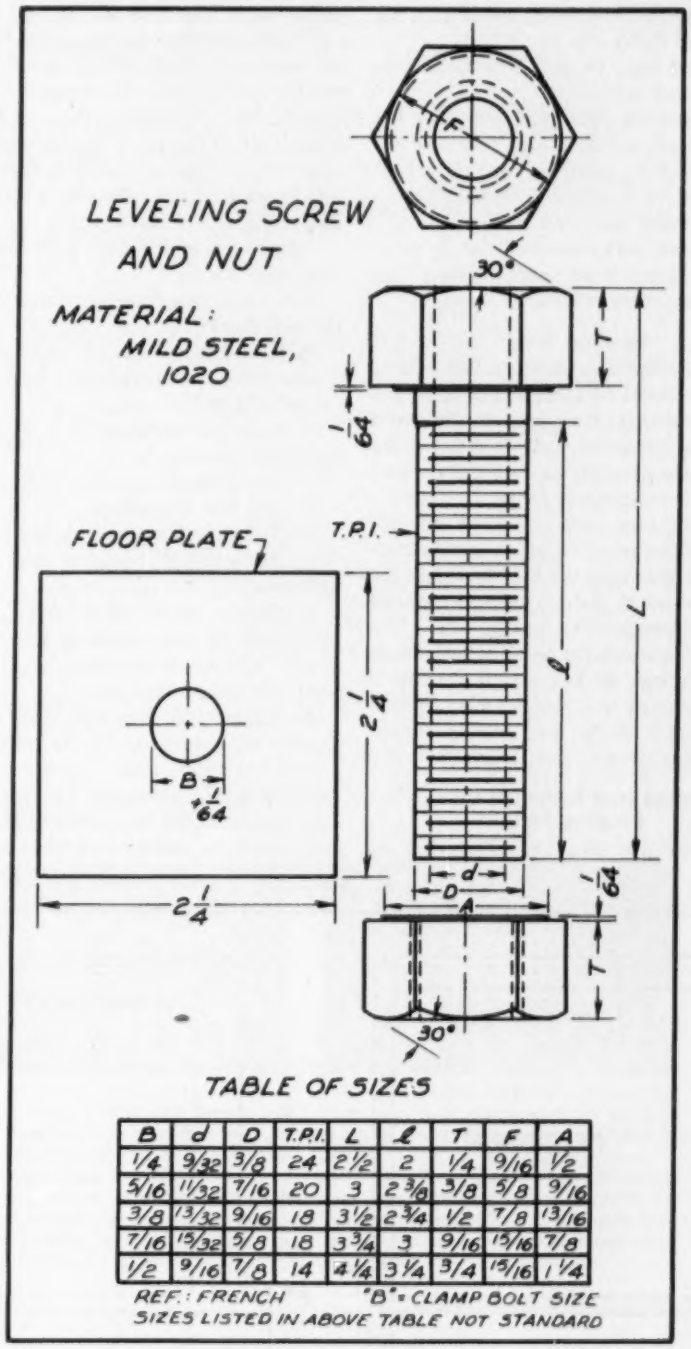


TABLE OF SIZES

B	d	D	T.P.I.	L	ℓ	T	F	A
1/4	9/32	3/8	24	2 1/2	2	1/4	9/16	1/2
5/16	11/32	7/16	20	3	2 3/8	5/8	5/8	9/16
3/8	13/32	9/16	18	3 1/2	2 3/4	1/2	7/8	13/16
7/16	15/32	5/8	18	3 3/4	3	9/16	15/16	7/8
1/2	9/16	7/8	14	4 1/4	3 1/4	3/4	15/16	1 1/4

REF.: FRENCH "B" = CLAMP BOLT SIZE
SIZES LISTED IN ABOVE TABLE NOT STANDARD

Details of leveling screw

11. Move the two parallels and level to the tailstock and repeat step 10.

12. Repeat steps 10 and 11 until the lathe is brought into *exact* level.

13. Tighten all bolts. CAUTION: Do not draw bolts so tight that they draw the bed out of level. They should be just tight enough to keep the machine from *creeping*. This is sometimes called *snugging* a bolt.

14. Recheck both headstock and tailstock with level. It may be necessary to loosen bolts and readjust shims or wedges.

Leveling Bolts

It has already been pointed out that leveling bolts have several advantages over shims and wedges. Leveling bolts are easy and inexpensive to make and furnish the students an interesting job. To make these for the entire shop would present a fine experience in quantity production. The drawing gives a table of sizes for every machine tool. To avoid certain difficulties that may arise the bolt sizes given are less than standard. Be sure there is clearance for the bolthead so that it may be turned with a wrench. To choose the proper bolt, measure the hole through the bolt pad. If the hole is not already equal to a National Fine tap drill size, enlarge it so the hole may be tapped. Use only *fine threads* to get finer adjustment.

Leveling and Fastening Using Leveling Bolts

The directions given are those for an engine lathe. The same idea is used to level and fasten any other machine tool. The tools and equipment required are a precision level, two matched parallels, center punch, lag bolts, washers, heavy hammer, crowbar and, if the lathe is to be bolted to a concrete floor, a star drill and expansion shields. Follow steps 1 to 6 inclusive, just as was done for leveling with shims or wedges.

7. Run level screws down in the legs until they touch the floor.

8.–9. Same steps 8 and 9 as used for leveling with shims.

10. Raise the low side of the lathe by adjusting level screws until the bubble is in center of glass.

11. Move the two parallels to the tailstock and repeat step 10.

12. Repeat steps 10 and 11 until the lathe is brought into exact level.

13. Tighten lock nut on each leveling screw.

14. Recheck both headstock and tailstock with level.

15. Same as step 13 using shims.

16. Recheck both headstock and tailstock. It may be necessary to loosen clamp bolts and level bolt nuts to readjust.

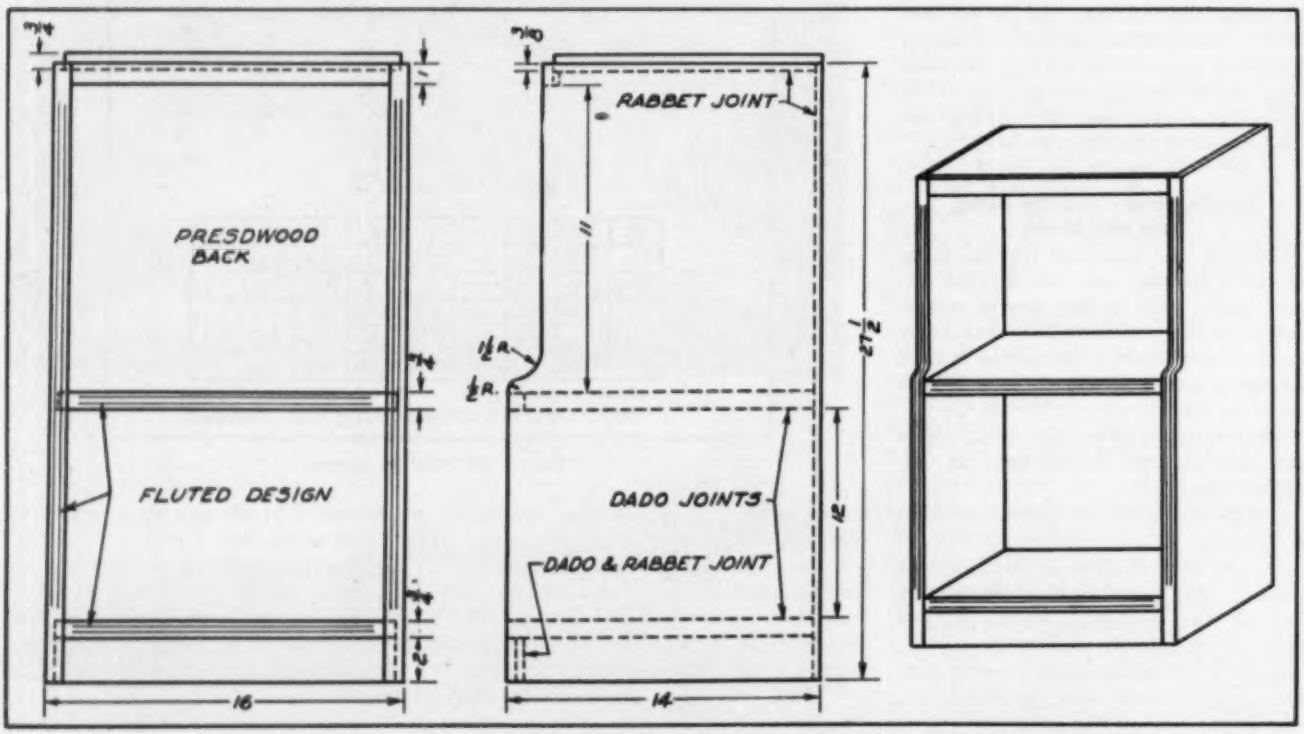
An experienced millwright does this job quickly and accurately. To the student, it is a lesson in patience and appreciation of the accuracy and craftsmanship that goes into the manufacture of fine machine tools. Perhaps he will regard the tool as something more than a series of levers which control the cutting of a bar of metal.

CORRECTION

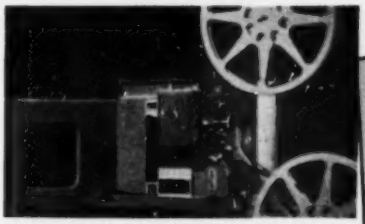
Much to our regret, we find that the legend under the cut on page 118 in the April, 1953, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION is in error. The picture does not show a shop layout of a general shop, but rather the composite equipment suitable for planning school shops.

The period ahead will be known as the American Renaissance. Teachers will play an important part in that Renaissance. To help bring it about, develop adults of tomorrow who are characterized by "animated moderation." Such persons have clear, energetic minds; never slow, never excessive, never exaggerated in their thinking. — *Roger M. Kyes, Vice-President, General Motors.*

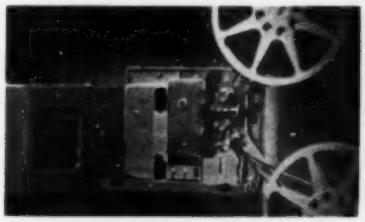
Two out of five school children are handicapped by inadequate eyesight, and almost all could be brought up to par by proper care. — *American Optometric Association.*



Record album cabinet. Designed by Orlo Allen, Douglas, Wyo.



Kodascope Pageant Sound Projector. The economical, top-choice machine for sound and silent projection under average conditions. Where optimum sound distribution is desired, plug in the Kodak Multi-Speaker Unit, three extra speakers in matching case. Projector, complete with 8-inch speaker, $400. Multi-Speaker Unit, $92.50. *Sound and silent projection.*



Kodascope Pageant Sound Projector, Model AV-071, with Plus-40 Shutter. Super-brilliant version of the standard Pageant, featuring the Plus-40 Shutter which increases light by more than 40%. Ideal for projection in hard-to-darken rooms, halls, or auditoriums; for long screen throws or unusually large picture areas. $400. *Sound projection only.*

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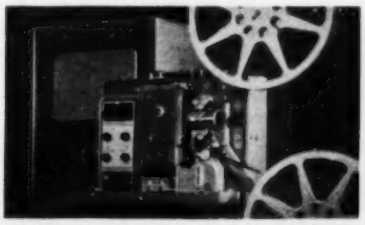
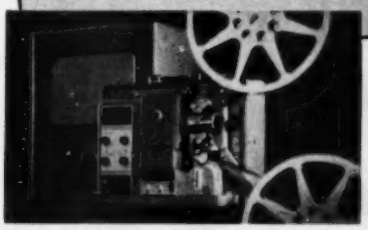
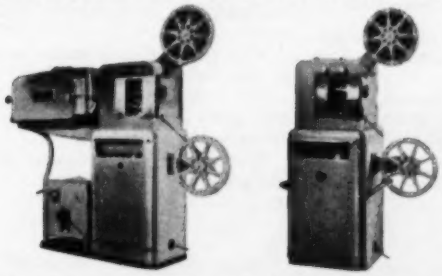


Kodascope Pageant Sound Projector, Model AV-151, with 15-watt amplifier. A powerful high-fidelity amplifier teamed with the extra capacity of the 12-inch Kodak De Luxe Speaker provides sound ample for auditorium projection. Separate bass, treble, and Fidelity controls afford the finest sound quality obtainable with a portable projector. $530. *Sound and silent projection.*



Kodascope Pageant Sound Projector, Model AV-151E, with Plus-40 Shutter and 15-watt amplifier. Combines the extra light from Kodak's Plus-40 Shutter with the precise tone-and-volume features of the Model AV-151. Its brilliant screening and superb tonal quality enable you to meet *every* 16mm. sound requirement short of a theater-type installation. $530. *Sound projection only.*

Kodascope Analyst Projector. Designed for 16mm. motion-picture analysis. Heavy-duty reversing mechanism operates from remote-control switch on 5-foot cord. Constant-speed blower permits repeated, instantaneous film reversals with complete safety for film and projector. Includes Kodak Daylight Projection Viewer for desk-top movie study. $295. *Silent projection only.*



The Eastman 16mm. Projector, Model 25, for theater-quality projection. Built for heavy-duty service in large auditoriums, theaters, or assembly halls. Powerful optical system and high-fidelity sound system assure top performance from any 16mm. optical sound film. Two models, high-intensity arc (left), and tungsten (right). Prices from $3270.

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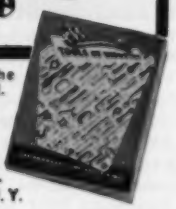

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ASSOCIATION NEWS

(Continued from page 8A)

THE NORTH CAROLINA INDUSTRIAL ARTS ASSOCIATION

The North Carolina Industrial Arts Association held its spring meeting in Raleigh, N. C., on Saturday, April 11, 1953. The theme of the meeting was a project fair in which the industrial-arts teachers exhibited sample projects of their students' work. Prizes were given for the winning students' projects in each classification and area. The classification was determined by the students' grade level, age, and experience in industrial arts. The areas represented were wood, metal, electricity, leather, plastics, ceramics, printing, and textiles. The prizes were donated by leading hardware and industrial-equipment dealers of North Carolina.

The president, Claude Bell of Charlotte, N. C., presided over the afternoon meeting which was high lighted by an address by Michael Radock of the Educational Division, Ford Motor Company. His address was entitled "Public Relations for Industrial Arts."

The following officers were elected for 1953–54: president, Frank Briley, Raleigh, N. C.; vice-president, T. J. Haigwood, Charlotte, N. C.; secretary-treasurer, Marshall Schmitt, Raleigh, N. C., and Henry Bruton, Winston Salem, N. C., member of the executive committee. — *T. J. Haigwood.*

♦ The Central Minnesota Industrial Arts Association is a professional organization of industrial-arts teachers in Central Minnesota. Four meetings are held each year. Demonstrations, lectures, discussions, trips through industries, and the exchange of teaching ideas is the normal agenda.

This year our spring meeting staged an exposition to which students, parents, the public, administrators, and industrial teachers were invited. There was a display of student projects to winners who had exhibited their work. The prizes were contributed by the businessmen and professional groups from the various villages in which industrial-arts is taught in the high schools. Some industries also had displays at the exposition, all of which helped to make the affair a big hit. The exposition was held at Stewart Hall, St. Cloud State Teachers College, St. Cloud, Minn., on May 9, 1953. It was an all-day affair and those who attended agreed that they had a most enjoyable time. — *Howard R. Walton.*

INDUSTRIAL EDUCATION CONFERENCE

The first Industrial Education Conference of its kind in Arkansas was held on the campus of Arkansas A. & M. College, March 20 and 21, 1953. The conference hosts were the Industrial Education Department and the Student Industrial Education Club.

The registration period was from 4:00 to 6:15 p.m., on Friday, March 20.

Dinner was then served cafeteria style in the dining hall of the student union.

An open forum discussion, led by Fred Graham, assistant superintendent in charge of vocational and adult education, Little Rock public schools, was then held. The subject: "Problems of the General Shop."

Dr. Chris H. Groneman, head, industrial education department, Texas A. & M. College, College Station, Tex., was the main speaker. He chose for his subject "Industrial Education in the South."

On Saturday morning another open forum discussion, led by Jack Kraras, drafting instructor, Pine Bluff High School, was held. "Problems of First Year Drawing" was the subject discussed.

Then a demonstration was staged by the Rockwell Mfg. Co., Delta Tool Division.

John Claude, special school representative, and Frank Goodman were the Delta representatives.

The leather tooling and carving demonstration was put on by Henry Fears, graduate student, Texas A. & M. College.

Metal foil tooling and special use of aids on the table saw was presented by Arkansas A. & M. I. E. students.

At 10:30 a.m., a tour of Ward Bros. Mfg. Co., manufacturers of aluminum boats, was undertaken.

After the tour a conference luncheon was held at the student union building.

Dr. Chris H. Groneman, the main speaker, then spoke on "Challenges Confronting Industrial Education."

The drawing of door prizes and the business meeting closed the conference.

Pipelines, the intricate system by which oil travels underground, totaled 168,301 miles as of January 1, 1953. Some 27,800 miles of these pipelines carry refined products to market places. — *Petroleum Newsnotes.*

SO YOU'RE GOING TO BUY A PLANER

Then here are some facts which you should have before purchasing.

	Boice-Crane	Make "A"	Make "B"	Make "C"
1-piece, Lifetime Aligned Frame	Yes	No	No	No
Optional Feed Rates through simple switch of pair of gears	Yes	No	No	No
Spring-loaded Feed Roll Pressure adjustable without wrenches	Yes	No	No	No
Self-Aligning Cutterhead Bearings	Yes	No	No	No
Ball-Thrust Bearing equipped Table Raising Screws	Yes	Yes	No	Yes
Capacity	12⅛" x 4"*	13" x 5"	12" x 4"	12" x 4"
Shortest piece handled	6½"	6"	6"	7½"
Feed Rolls, diameter	2"	1¾"	1¾"	2"
Cutterhead, diameter Cutting Circle	2⅛" 2⅜"	2¾" 2⅛"	3¼" 3½"	3" 3¼"
Horsepower Required	1½–2 h.p.	3 h.p.	1–2 h.p.	1½–2 h.p.
Cuts per inch at standard feed rate	60	75	60	60
Feed Rate at 3600 r.p.m.'s	14	12	14½	13½
Shipping Weight, with 2 h.p. motor, stand, lbs.	680	728**	565	500
Optional Drives – Direct-Motor-Drive or V-Belt	Yes	No	Yes	No
Shock-proof Feed Gear, integrally housed, using solid lubricants	Yes	No	No	Yes
Least Costly model, less motor	$350.00	$495.00	$249.50	$290.00
Manufacturer Building "Pony" Planers Since	1933	1950	1936	1945

**3 h.p.

* Handles 99% of the average boards used. Planers with only one inch more capacity (only 7% more width and 25% more thickness) cost $145.00 (41%) more and use 50% more power. Furthermore, most boards exceeding 12 inches in width or 4 inches in thickness also exceed 13 inches in width and 5 inches in thickness.

Suggestion: Glued-up pieces, frequently 24" or more wide, are finished most economically by using a Boice-Crane planer before gluing and then sanding off excess glue with a Boice-Crane 60-inch Hand Stroke Belt Sander. So, for hundreds of dollars less than the cost of an outsize planer (rarely used for stock over 12" wide or 4" thick), you can own both of these Boice-Crane machines.

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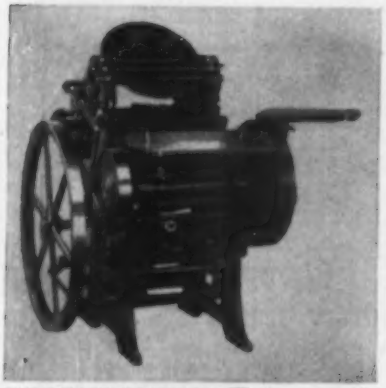

C&P NEW SERIES PRESSES These presses in sizes of 8x12, 10x15, 12x18 and 14½x22, provide the student with equipment that furnishes all practical requirements of hand fed press operation. May be equipped with flywheel, belt and platen guards. Also furnished for treadle operation instead of motor drive.

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C & P presses and paper cutters have been standard equipment in commercial plants and schools for over 50 years. So, the selection of C & P equipment for printing classes places before the students *practical* equipment exactly as used in commercial practice in the entire printing industry.

In addition, special safety features are incorporated, when desired, in C & P presses and paper cutters so that all safety requirements are fully satisfied.

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C&P PILOT PRESS A thoroughly efficient little press, chase 6½x10, that teaches basic principles of press operation with exceptionally fine printing results.

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Personal News

DR. VERNE C. FRYKLUND HONORED

Recipient of an Outstanding Achievement Award as an honored alumnus of the University of Minnesota is Dr. Verne C. Fryklund, president of the Stout Institute, Menomonie, Wis. Dr. Fryklund was honored at ceremonies held on the University of Minnesota campus.

Bestowed by the University regents as a token of high esteem and in recognition of noted professional attainments, Dr. Fryklund's citation commends him as:

"A Distinguished Graduate of the University of Minnesota, President of The Stout Institute, Gifted Contributor to the Theory and Practice of Industrial Arts, Vigorous National Champion of Industrial Education, a Person Renowned for Meritorious Public Service in War and Peace."

In addition to the citation, Dr. J. L. Morrill, president of the University of Minnesota, presented President Fryklund with the Outstanding Achievement Award medal.

The Outstanding Achievement Award has been designed by the University for alumni who have attained signal distinction in their chosen field. According to the aims of the award:

"All recipients have earned the respect and admiration of their professional colleagues. The presentation of the Award is an expression of the deep obligation which all of us have for those who have lived courageously and fruitfully to the end that society in general benefits."

Honored with Dr. Fryklund were Edna Amidon, home-economics specialist in the U. S. Office of Education; Luella Cook, Minneapolis curriculum consultant; William Reeve, emeritus professor of mathematics at Columbia university; and James Umstattd, chairman of the department of curriculum and instruction for the University of Texas. — *T. F. Fleming.*

DR. FRED STRICKLER JOINS NAM

Dr. Fred Strickler, dean of Bennett College at Bradley University, has submitted his resignation, effective April 30, to the Bradley Board of Trustees in order to become educational director of the central division of the National Association of Manufacturers.

He will make his home in Detroit.

DR. L. H. DENNIS APPOINTED VOCATIONAL EDUCATION ADVISER TO TCA

Dr. L. H. Dennis, nationally known authority on vocational education, was sworn in as a consultant to the technical co-operation administration, Department of State. Richard E. Morrissey, personnel officer of the Department of State, administered the oath.

Dr. Dennis' first assignment as vocational education adviser to TCA went to Baghdad where he advised the U. S. Technical Co-operation (Point 4) Mission to Iraq and the Iraqi Ministry of Education about the establishment and organization of a vocational and technical school.

Dr. L. H. Dennis being sworn in as technical co-operation administrator, Department of State, by Richard E. Morrissey, personnel officer of the department

He arrived in Baghdad on or about April 25. En route he stopped at Paris to confer with UNESCO officials and at Cairo to see the new Heliopolis Trade School. On his return he will visit the American University at Beirut and FAO officials in Rome.

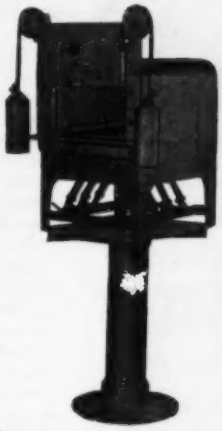
Dr. Dennis has opened offices in Washington, D. C., as a private vocational education consultant after having served for 17 years, from 1934 to 1950, as executive secretary of the American Vocational Association. He also has been actively associated with Alpha Zeta, honorary agricultural fraternity, for 41 years and is presently its secretary and treasurer. For 21 years he was on the staff of the state department of public instruction of Pennsylvania, serving as deputy

(Continued on page 20A)

EASY FAST

Now ONE Furnace for teaching a variety of heat treating techniques

THE JOHNSON No. 706



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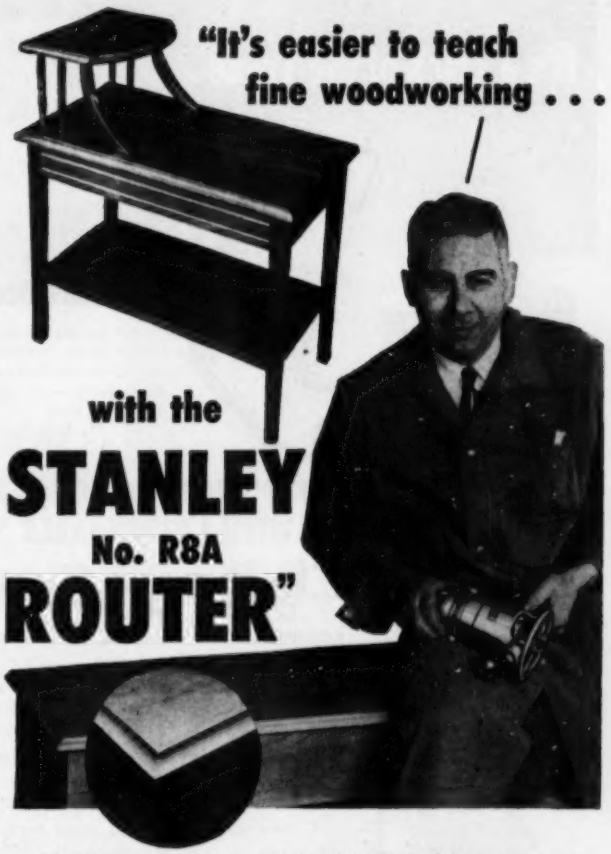

"It's easier to teach fine woodworking . . . with the STANLEY No. R8A ROUTER"

• "Confidence and skill are developed faster in students, teaching is simpler with the Stanley No. R8A Router," says Nelson Lyons, woodworking instructor at Bristol (Conn.) Technical High School. Mr. Lyons is shown here above with two of the many projects made in his shop with the aid of this router.

Help *your* students to turn out finer work with the versatile R8A Router. After only brief instruction, it enables beginners to bead, cove, flute and dovetail like professionals. Easily interchanged attachments and accessories make it possible to perform almost countless woodworking operations. Outstanding features of the R8A Router include high speed ½ h.p. motor that assures smooth cuts with or across grain . . . recessed safety switch to prevent accidental operation . . . simple, precise adjustment for depth of cut. Weight less than 7 lbs., operates on A.C. or D.C.

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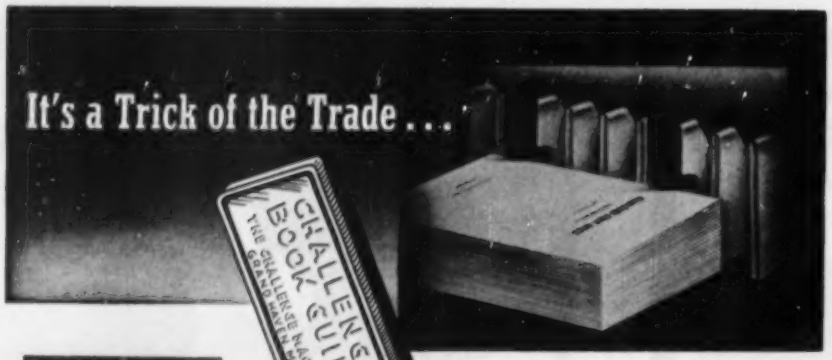

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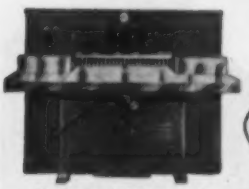
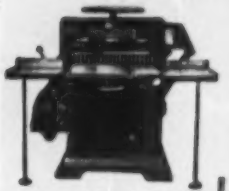


Challenge 370 Automatic (Hydraulic Clamp) Cutter

BUT IT'S NO TRICK TO DO AN ACCURATE JOB WITH A DEPENDABLE

Challenge Cutter



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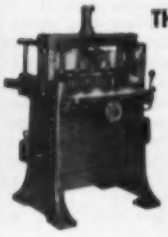
Challenge 265-305 Lever Cutter

Challenge 265-305 (Hydraulic Clamp) Power Cutter



Challenge Pony Lever Cutter

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PERSONAL NEWS

(Continued from page 18A)

state superintendent and state director of vocational education.

DEAN JOHN A. JARVIS RECEIVES DOCTORAL DEGREE

Dr. John A. Jarvis received his doctoral degree at the March commencement exercises of the University of Minnestota, held in Northrop Memorial auditorium, Minneapolis, Minn.

He had earned his bachelor of science in mechanical engineering from the University of Wisconsin, Madison, Wis.; a bachelor of science in industrial education from The Stout Institute, Menomonie, Wis., and a master of education degree from Wayne University, Detroit, Mich.

Working under Dr. Homer J. Smith, chairman of the industrial education department at the University of Minnesota, Dean Jarvis wrote his doctoral dissertation on "Student Survival Factors in The Stout Institute."

ERNEST W. RIDER DIES

Ernest W. Rider, supervisor of practical arts in the Bridgeport, Conn., school system, died in January, 1953. He had been supervisor of industrial arts from 1923, and in 1934 he was further appointed to supervise classes in clothing and foods, with change in title to supervisor of practical arts.

Mr. Rider's guidance and friendliness will be missed not only by the teachers of Bridgeport, but by his many friends and associates in the New England States and other groups with whom he came in contact.

Pending Civil Service promotional examinations at some future date, Edward P. Stach has been appointed acting supervisor of practical arts.

FRANK M. LEAVITT, 87, DIES

Just as this issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION was coming off the press, our editorial office was informed that Frank M. Leavitt, teacher and author, died on May 1 at the age of 87, at St. Petersburg, Fla.

He was born in Boston, Mass., September 20, 1865, and attended the Massachusetts Institute of Technology. He taught at the Elliott School in Boston, and was appointed director of manual training in the Boston public schools. He then went to the University of Chicago as a professor and completed his career as associate superintendent of schools in Pittsburgh, Pa.

He contributed much to the literature of the fields of industrial arts and vocational education and was known as a dynamic lecturer. He retired in 1935.

He is survived by his widow, a son, and a daughter. For a full account of his life see Dr. Bawden's article in the November and December, 1951, issues of this magazine.

JOHN A. BACKUS RETIRES

John A. Backus, manager, department of education, American Type Founders, Elizabeth, N. J., retired on March 31. He is 71 years of age and has been associated with ATF for 28 years. He will continue to be associated with the company on a consulting basis.

John T. Porter, formerly Pacific Coast representative of ATF's education department, will succeed Mr. Backus.

FRANK CUSHMAN DIES AT 73

Frank Cushman, a national authority in the field of industrial education, died Monday, April 27, 1953, at his home in Long Beach, Calif.

He was born in East Boston, Mass., and was graduated from the Massachusetts Institute of Technology. Then he was made teacher of shop and technological subjects at Kansas City, Mo., and served there for 17 years. He also studied at the University of Kansas.

In 1921, he was made regional agent for trade and industrial education with the Federal Board of Vocational Education. He held the position of chief of the section's industrial education for 16 years. At the time of his retirement at the end of 25 years at Washington, D. C., he was consultant in vocational education in the United States Office of Education.

He was a pioneer in the development of foreman training, and in preparing conference leaders. He also was a voluminous writer in the field of industrial education.

During World War II he was made commander at the Navy Department and had much to do with emergency war training.

He is survived by one son, a daughter, a brother, and five grandchildren.

♦ ARTHUR C. WENZEL, former member of the industrial-arts faculty at State Teachers College, California, Pa., accepted the position as dean of men at the State Teachers College, Shippensburg, Pa., at the beginning of the present semester.

Mr. Wenzel started his educational training at the State Teachers College in Newark, N. J., and received his B.S. in education in 1937. Further education included the acquisition of a master's degree in education from Rutgers University in 1943. He is well along toward a doctorate at the University of Pittsburgh.

♦ ARTHUR GALE HENKE, formerly teacher and businessman of Idaho Falls, Mont., has returned to a teaching position of industrial arts at Dubuque, Iowa.

News Notes

♦ The printing trades — one of the highest paid groups of workers in the nation — will need thousands of new workers during the 1950's, primarily to replace those who leave their jobs in the industry because of death, retirement, or transfer to other fields of work. The printing industry employed 785,000 workers in January, 1953.

Job printing is the largest branch of the industry. Newspapers employ the second largest number of printing trade workers. *Lithographic* plants which use the special process of lithography to produce colored and other printed matter, compose the third largest employer. Bookbinders, periodical printers, book publishers, and greeting card printers ran next in order.

Printing requires six major types of workers: composing room workers, the largest group; pressroom workers; bindery workers; electrotypers; stereotypers, photoengravers; and lithographic workers. Most printing workers are skilled; the main exceptions are the press assistants and most of the bindery workers, who are semiskilled. Practically all the workers in the skilled occupations are men, but many of the semiskilled workers, especially in binderies, are women.

Apprenticeships for the printing trades usually require from four to six years. To be eligible for apprenticeship, applicants are generally required to be 18 years of age and to have a high school education. A thorough knowledge of spelling, punctuation, and grammar is essential for most trades.

To provide employment outlook and related occupational information on the printing industry to those who have a special interest in it, the U. S. Department of Labor's Bureau of Labor Statistics has issued a reprint from the 1951 edition of the *Occupational Outlook Handbook*. This reprint, BLS Bulletin No. 1126, describes the printing industry and its major occupations. The occupational descriptions include the nature of the work, training requirements, fields of employment and outlook, earnings, and sources of additional information. The reprint may be ordered from the Government Printing Office, Washington 25, D. C.

A wall chart, depicting the number working in the principal fields of employment, average earnings for printing workers, and the flow of work in printing establishments, is available on request to the Bureau of Labor Statistics.

♦ A revised edition of "Your Skill Improvement Program" has been issued by the U. S. Department of Labor's Bureau of Apprenticeship.

This 16-page booklet, designed to help the employer develop a skill improvement program, contains a check list for the employer's use in making spot evaluations of his current training system and training needs. It also outlines services of the Bureau which are available to the employer in establishing training programs to meet those needs.

Copies of this new edition may be obtained from the Publications Branch, Bureau of Apprenticeship, U. S. Department of Labor, Washington 25, D. C.

♦ Among the new Assembly Bills at Madison, Wis., is one from the Wisconsin State Department of Public Welfare to operate an auto repair shop at the Reformatory with inmate labor — for the benefit of inmates learning the auto repair trade. The shop would receive cars only from "licensed automobile dealers and regularly established automobile repair shops."

♦ The James F. Lincoln Arc Welding Foundation of Cleveland, Ohio, is offering $13,500 in awards for the best descriptions covering the possible use of arc welding in the maintenance, operation, or in the services performed by establishments such as school plants, and similar non-industrial businesses and service establishments. The types of businesses and service establishments in which awards will be made have been selected on the basis that to date arc welding has had relatively little use in many of them.

For a rules booklet and further information about this program write to *James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.*

♦ High school teachers of driver education will have an opportunity to discuss present and future problems in highway transportation with outstanding leaders in the traffic field during a two-week seminar to be given in August at Northwestern University in Evanston, Ill.

The seminar presentation will be under the direction of F. R. Noffsinger, who is in charge of course development for the Traffic Institute.

For further information about this seminar, write to the *Traffic Institute, 1704 Judson Ave., Evanston, Ill.*

♦ Five members of the Kent State University, Kent, Ohio, staff devote the greater part of their time to supervision and teacher education in the areas of trade and industrial education and distributive education in Northeastern Ohio.

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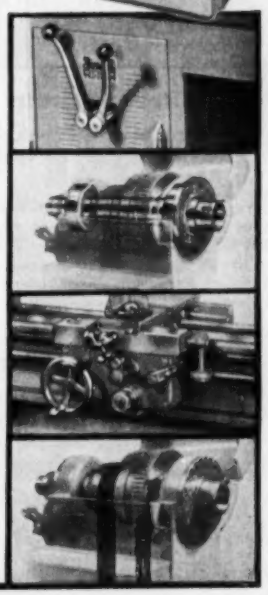

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New Publications

Simplified Drafting Practice

By William L. Healy and Arthur H. Rau. Cloth, 156 pp., 8⅝ by 11¼ in., illus., $4. New York: John Wiley & Sons, Inc.; London, Chapman & Hall, Ltd.

The authors of this book, both of whom have extensive industrial experience in engineering drafting, present a plan which definitely introduces labor, time, and cost saving methods into drafting practice.

This simplification is brought about by eliminating unnecessary work, resorting to freehand work, and using symbols and abbreviations. Also by using various forms of mechanical lettering and reproduction methods.

Teachers can profit greatly by studying this text carefully.

Design Your Home for Living

By Mabel B. Trilling and Florence Williams Nicholas. Cloth, 408 pp., 6⅛ by 9 in., illus. J. B. Lippincott Co., Philadelphia, Pa.

A book to be studied and enjoyed. It covers both exterior and interior home design and is illustrated beautifully.

There are 17 chapters and they treat the subject under the following thought-provoking headings: Make Your Home Beautiful, Law and Order in Art, Beauty and Utility Are Partners, Using and Enjoying Color, Make the Most of What You Have, On the Dining Table, What Will Your Windows Wear?, Backgrounds to Live With, Furniture for Everyday Living, Pictures for Your Walls, Choosing and Using Decorative Accessories, Garden Beauty Inside the House, Lighting for Brighter Living, Homes for Today and Tomorrow, Beauty That Grows in the Garden, Remodeling Operations — Major and Minor, Design Your Home for Better Living, and References for Further Study.

Pottery: Getting Started in Ceramics

By Delmar W. Olson. Cloth, 113 pp., 7⅝ by 10⁵⁄₁₆ in., illus., $3.75. International Textbook Co., Scranton 9, Pa.

The beginner in pottery work will derive great benefit from this book. It is well illustrated and the directions are given in clear and understandable terms.

The various chapters treat of the history of pottery, design in clay, hand forming methods, decorating techniques, glazes, firing, the potter's wheel, mold making and casting, and equipment planning for hobby and school shops.

The book also contains a selected bibliography.

The Dutch Masters

By Horace Shipp. Cloth, 128 pp., 7⅝ by 9¾ in., plus 11 plates, $6. Philosophical Library, Inc., New York 16, N. Y.

This book on the Dutch Masters presents the reader with a brief sketch on the social background of the Dutch, a sketch of early Dutch art, and then short dissertations on Frans Hals, Rembrandt, painters of genre, Vermeer and DeHooch, and Dutch landscape, marine, and still life painters.

The book also contains 16 plates in colors and 25 plates of black and white half tones depicting the work of the Dutch masters.

Your Career Opportunities in Evansville Industry

By H. F. Williams, Jr. Paper, spiral binding, 192 pp., 9½ by 12 in., illus. Published by The Evansville Manufacturers and Employers Association, Public Relations Division, Evansville, Ind.

This book is a portrait of the city of Evansville, Ind., where 40,000 men and women produce numerous peacetime and military products needed by our country.

The book has a double purpose. It presents to youth a picture of the opportunities that local industry offers to them, and also shows how their entrance into military service can help them prepare for the vocational goals at which they are aiming for the future.

The contents is interspersed with numerous pictures portraying what workers in the various occupations do to make a livelihood.

Ladies' Glovemaking

By Virginia Groneman. Paper cover, 12 pp., 5⅜ by 8¼ in., illus., 50 cents. Chas. A. Bennett Co., Inc., Peoria 3, Ill.

A small portion of Chris H. Groneman's book, *Applied Leathercraft*. It is an excellent little text for the beginner — be he student or hobbyist.

The directions are interestingly presented and the illustrations are very good.

Jewelry Making as an Art Expression

By D. Kenneth Winebrenner. Cloth, 181 pp., 7¾ by 10¼ in., illus., $5. International Textbook Co., Scranton, Pa.

A text on contemporary jewelry making and designing. The book contains 1117 items, designs, and steps in processes.

The chapters on selecting materials and tools for the job, and for setting up a home or school shop, are helpful.

Some of the designs pictured are beautiful while others are bizarre. They do, however, provide thought-provoking examples for the beginner.

Small Business Management

Paper cover, spiral binding, 213 pp., 8 by 10¼ in., illus. This is a publication of the New York State Vocational and Practical Arts Association. Published by Delmar Publishers, Inc., Albany, N. Y.

It aims to teach the fundamentals necessary for the successful operation of a self-owned business to the student while he is still in school.

The book is divided into ten units which present the problems of business operation, basic business law, business forms and records, problems pertaining to location and finances, ordering and inventory, shop or store layout, how to improve the business, and employer-employee relations.

The book also contains a bibliography and a glossary.

Surveys of representative communities indicate that more than 12 million American children need vision care to perform their school tasks adequately, according to the American Optometric Association.

Boys are five times as likely as girls to inherit color blindness. — *American Optometric Association.*

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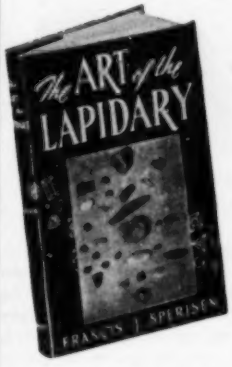

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By
Francis J. Sperisen

Gems and semi-precious stones, from their types and characteristics to their carving and polishing, make up this most complete work on the art of the lapidary. It describes all the finer points of lapidary techniques, pertinent history, and recognition of stones. Beautifully illustrated. 392 pages, $6.50

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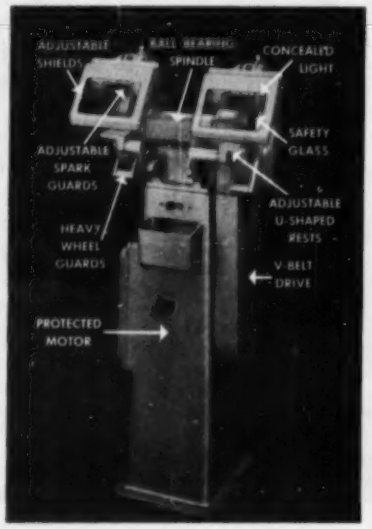
SHOP EQUIPMENT NEWS

PEDESTAL TOOL GRINDER

South Bend Lathe's new Pedestal Tool Grinder is easy to operate and practically trouble free.

There is plenty of work room around the grinding wheels on this tool grinder, and it runs practically vibrationless, and the motor is protected from harmful abrasive dust.



South Bend Pedestal Tool Grinder

The grinder comes with either 8-in. grinding wheels and a ½ horsepower motor or with 10-in. wheels and a ¾ horsepower motor. Compactly built, it measures 49½ in. high, 18½ in. wide, and 20½ in. deep.

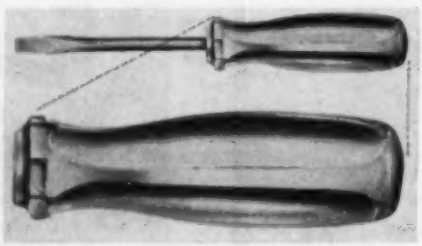
For additional information write to *South Bend Lathe Works, South Bend 22, Ind.*

For brief reference use IAVE—0601.

PROTO PLASTIC-HANDLE SCREW DRIVERS

A hand-shaped, nonrolling design for the plastic handles of all Proto screw drivers and addition of 13 new sizes have been announced by the Plomb Tool Company.

The new-style handles are shaped to fit the hand, with depressions for the thumb and forefinger to allow great downward pressure with little squeezing effort. A larger diameter than in previous designs provides a more powerful grip.



New, hand-shaped, nonrolling plastic handle used on Proto screwdrivers

An octagonal shape at the lower end of the handle prevents rolling. A larger surface on the butt end allows greater, more comfortable pressure with the palm.

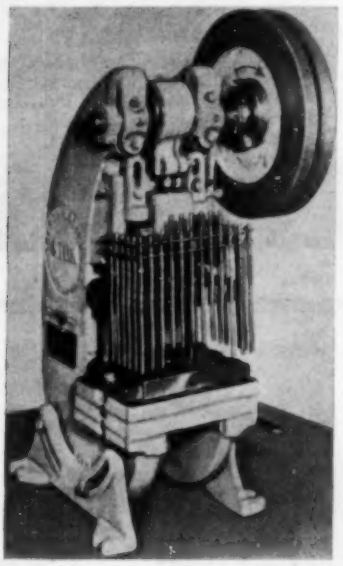
Handles are molded integrally with special alloy steel blades. The plastic is tough, a good insulator, nonexplosive, and listed by Underwriters' Laboratories.

For further information address *The Plomb Tool Co., 2204 R Santa Fe Ave., Los Angeles 54, Calif.*

For brief reference use IAVE—0602.

BENCHMASTER UNIVERSAL PUNCH PRESS SAFETY GUARD

The new Benchmaster barrier-type punch press guard provides maximum operator safety regardless of die used. It fits all Benchmasters as well as other presses and is low in cost.



Benchmaster Universal Punch Press Safety Guard

Design is extremely simple and flexible. By dropping numerous vertical rods (the number depends on size of bolster plate) through any pair of prelocated holes in horizontal guard plates, a protective cage is set up around the die area. Virtually any shaped contour can be formed by simply varying the height and position of the rods in the guard plates. The rods are held at desired heights by means of small clips. To change the pattern for a new die requires only seconds. Openings in the guard can be arranged to permit parts to be inserted or ejected from the die.

The new Benchmaster guard is easily and quickly attached to almost all makes of punch presses. It can be also used in conjunction with sweep, pull-out, and two-hand trip guards.

For literature and prices write to *Benchmaster Manufacturing Company, 1835 West Rosecrans Avenue, Gardena, Calif.*

For brief reference use IAVE—0603.

(Continued on page 26A)

Ever wish you had six hands?

Sure! . . . and a lot of other school equipment buyers have, too . . . so what did they do about it? They just stopped wishing, and nonchalantly reached for their big B-G Master Catalog—that ever-handy "showcase" of more than 15,000 most needed, most wanted machines, equipment and school supplies. Yes, sir, with the B-G catalog, you really get EXTRA hands . . . thousands of 'em! . . . hands that have fingered tons of literature, have sampled and tested products from all leading school supply markets, have dialed millions of miles in long distance telephone calls, have written tens of thousands of orders to hundreds of manufacturers . . . and all to make it easier for you to get everything you need quicker, more economically, and from one dependable supply source. So if you ever find yourself wishing you had six hands, don't call the doctor, don't visit a psychiatrist—just pick up your B-G Master Catalog—and see how one hand doing business with one master supply source can instantly cure all your buying headaches, heartaches, and budgetaches. Why not try it on your next order?

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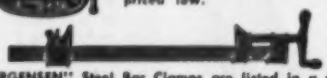

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Model No.	Interior Size	Shelves Furnished	Approx. Time	Price F.O.B. Phila.
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7004	8"x 8"x11"	2	4 hrs.	$ 95.00
7005	12"x12"x11"	2	3 hrs.	$205.00
7007	15"x15"x16½"	3	4 hrs.	$410.00
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Enameling on copper can be efficiently fired on our models No. 7006 and 7009.

THE ELECTRIC HOTPACK CO., INC.
5067 Cottman St. Philadelphia 35, Pa.

SHOP EQUIPMENT NEWS

(Continued from page 24A)

NEW HESTON AND ANDERSON WOOD SHAPER

Heston and Anderson, a division of the St. Paul Foundry and Manufacturing Company, has added a new wood shaper to its line of quality woodworking machinery.

No. 752 Heston and Anderson Wood Shaper

The "752," as it is called, is of modern design and sturdy construction. It features high speed knives together with a large 20 by 20-in. table with an adjustable guide fence. It has life sealed ball bearings, weighs 155 lbs. with motor, and stands 36 in. high. All moving parts are covered for maximum safety.

Literature concerning the product is available on request to *Heston and Anderson, Fairfield, Iowa.*

For brief reference use IAVE — 0604.

TANG BUTT CHISELS IN HANDY NEW SETS

Greenlee Tool Company announces its new line of No. 403 Tang Butt Chisels. The sets are available in a choice of wood cases, plastic rolls, or metal-edge fiberboard boxes.

The No. 403 H-4 set consists of four chisels

Greenlee Tang Butt Chisels

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Morgan Vises

Morgan Woodworker's Vise either solid nut, continuous screw or quick action types

In woodworking, you'll find a MORGAN vise for every school shop requirement. Easy to work with, each type is accurately machined for best project results. Each is durable, dependable, made especially for trouble-free, daily hard use in your school shop. And each is guaranteed.

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(¼ in., ⅜ in., ¾ in., and 1 in.) in a hardwood case, with individual compartments. The exterior of the case is painted an attractive green, with the inside finished in natural hardwood.

The No. 403 R-6 set consists of six Greenlee Tang Butt Chisels (sizes ¼ in., ⅜ in., ¾ in., 1 in., 1¼ in., and 1½ in.) in a plastic roll. Chisels fit into individual pockets and are protected with covering flannel flaps.

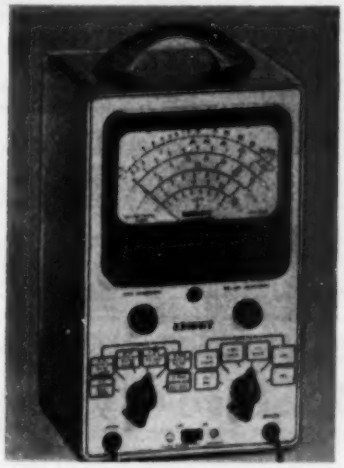
No. 403 C-1 set consists of three chisels (½ in., ¾ in., and 1 in.) in a metal-edge fiberboard box with snug fitting dividers that hold chisels securely in place.

Complete details and prices may be obtained by writing direct to *Greenlee Tool Co., 2136 Twelfth St., Rockford, Ill.*

For brief reference use IAVE – 0605.

ALLIED RADIO ANNOUNCES NEW VTVOM

Allied Radio Corporation, of Chicago, announces a new, KNIGHT low-cost, easy-to-build Vacuum Tube Volt-Ohm-Milliammeter Kit. Designed for maximum versatility, the KNIGHT VTVOM has six ranges for measuring a.c. peak-to-peak volts. It also includes six milliampere ranges and five capacitance ranges — 29 ranges in all. Thus, it not only serves as a standard



Easy-to-build Vacuum Tube Volt-Ohm-Milliammeter Kit

VTVM, for accurate measurements in high-impedance circuits, but it replaces the VOM as well. Frequency response is as high as 2.5 megacycles, adequate for TV circuits as well as for servicing audio units. These features coupled with low cost, make it an excellent all-round instrument for use in radio, electronics, and physics classrooms. Complete step-by-step instructions include schematic and pictorial diagrams to make assembly and wiring easy for anyone with some kit-building experience. An excellent building project to demonstrate basic features of an electronic test instrument.

Accurate readings are assured by a 4½-in. meter and 1 per cent matched resistors. The Hammertone gray metal case is 9 in. high, 5⅝ in. wide, and 5 in. deep.

For further information write to *Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.*

For brief reference use IAVE – 0606.

NEW DELTA COMBINATION TOOL

Delta Power Tool Division of Rockwell Manufacturing Company announces the production of a revolutionary new combination tool designed specifically for the homeowner "who wants to do it himself."

The new multipurpose tool, known by the trade name Deltashop, consists of the four basic tools used most often in a home workshop. The entire assembly is built around a tilting arbor circular saw. A feature of the saw is that the blade, rather than the saw table, can be tilted for angle cuts. Other separate components include a drill press, a jointer, and a sander.

Because many new homes are constructed without basements, Delta engineers insisted on a design that would be sufficiently compact for use and storage in the average small home.

This new combination tool meets this requirement. It occupies no more space than the average washing machine or dishwasher, and it requires even less area than a family-size electric refrigerator. It is three feet square, and is ready for instantaneous operation in any part of the house.

The Deltashop consists of a group of four basic tools able to perform 98 per cent of all home woodworking operations without attachments. The four tools are mounted on a single stand and receive power from a single motor. They can, however, be broken down into four individual tools and mounted on individual stands powered by individual motors.

The Deltashop in "normal" position is set up to function as a circular saw or a jointer. Change-over time for operation as a drill press is one minute — as a sander, 30 seconds.

The circular saw is an 8-in. tilting arbor saw. The design of the Deltashop enables the

(Continued on next page)

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Descriptive literature on request

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SHOP EQUIPMENT NEWS

(Continued from previous page)

operator to move his work directly from the circular saw to a 4-inch jointer without change-over.

The drill press incorporated into the Deltashop is a standard Delta 11-inch drill press. Less than a minute is required to make the change-over from a circular saw to a drill press.

The change-over from circular saw to disk sander on the Deltashop can be made in 30 seconds.

For further information see your local Delta dealer, your hardware store, or write to *Delta Power Tool Division, Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.*

For brief reference use IAVE — 0607.

DEITZGEN GLASS CLOTH PRODUCTS

The Eugene Deitzgen Company has published a brochure which promises to revolutionize the standard approach to engineering production. It already has saved thousands of man-hours and millions of dollars in the aircraft industry.

The brochure contains technical information that should be brought to the attention of your technical staff.

For further information, or prices, write or call the nearest Deitzgen office or Deitzgen dealer, or *Eugene Deitzgen Co., 2425 N. Sheffield Ave., Chicago 14, Ill.*

For brief reference use IAVE — 0608.

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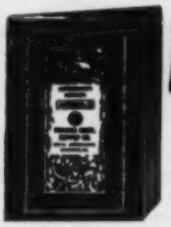

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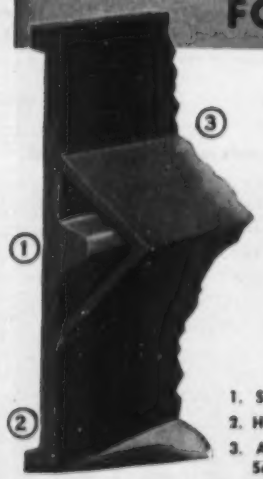

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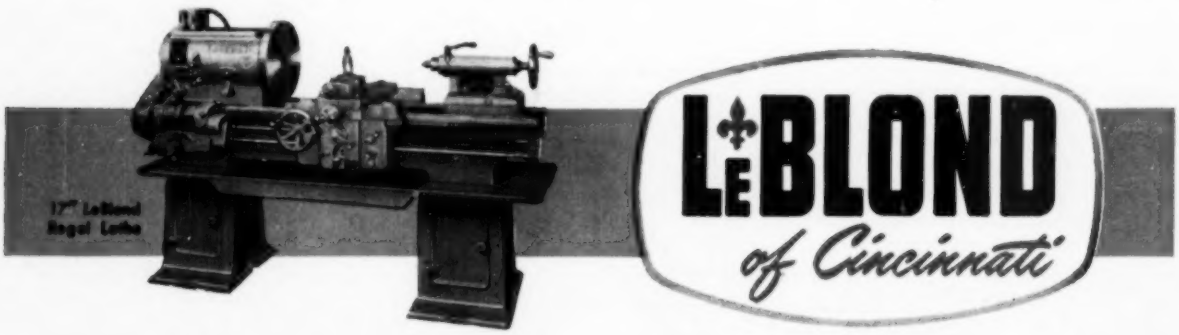

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